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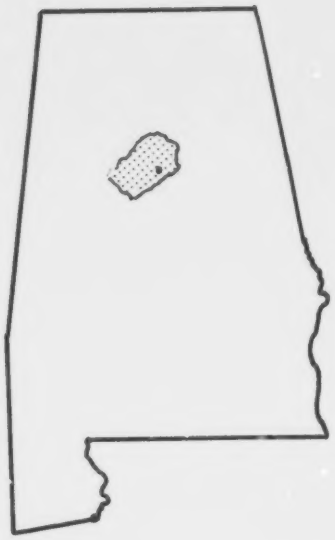
FLOOD INSURANCE STUDY

CITY OF BIRMINGHAM, ALABAMA

JEFFERSON COUNTY



REVISED

JANUARY 17, 1991

Federal Emergency Management Agency

COMMUNITY NUMBER - 010116

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

This publication incorporates revisions to the original Flood Insurance Study. These revisions are presented in Section 9.0.

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Flood Boundary and Floodway Map Index
Flood Boundary and Floodway Map

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Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY
CITY OF BIRMINGHAM, ALABAMA

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the City of Birmingham, Jefferson County, Alabama, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of the information will be to convert Birmingham to the regular program of flood insurance by the Federal Insurance Administration (FIA). Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

Community base map selection and the identification of streams requiring detailed study were agreed to in meetings attended by personnel of the U.S. Geological Survey (USGS), the FIA and officials of the City of Birmingham in May-June 1976. The areas of detailed study were reviewed by the FIA in May-June 1976, the limits were updated by the FIA in September 1976, and were confirmed in the contract with Betz-Converse-Murdoch-Inc. (BCM) on September 27, 1976. Hydrologic analyses and flood profiles for the Fivemile Creek, Village Creek, Valley Creek and Shades Creek and their tributaries within the City of Birmingham were coordinated with those being developed concurrently or developed previously by the U. S. Army Corps of Engineers (COE). There are several previous flood insurance studies for streams in Birmingham which were coordinated with this study (see 6.0).

During the course of the work by Betz-Converse-Murdoch-Inc., flood elevations, flood boundaries and floodway delineations were reviewed with community, county and state officials. On February 13, 1980, the results of the work were reviewed at a final coordination meeting attended by personnel of BCM, the FIA and officials of the City of Birmingham.

1.3 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by Betz-Converse-Murdoch-Inc. for the Federal Insurance Administration under Contract No. H-4034. This work, which was completed in March 1979 covered all significant flooding sources in the City of Birmingham.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Birmingham, Jefferson County, Alabama. The area of study is shown on the Vicinity Map (Figure 1).

Areas not included in the scope of study are either undeveloped, contain watersheds draining less than one square mile, or are areas where the terrain is such that the 100-year base flood would be contained within the present ravine.

Specifically, streams draining areas not studied area:

Fivemile Creek

1. No-name branch of Fivemile Creek from its southern entrance into the corporate limits near Zion City Road flowing northward to its confluence with Fivemile Creek near the Zion City Road stream crossing.

2. No-name branch of Fivemile Creek from a point near Lyn Acres Drive and Kallough Springs Road flowing southward to its confluence with Fivemile Creek just west of Fivemile Road stream crossing.

3. No-name branch of Fivemile Creek from its northern entrance into the corporate limits near Fivemile Road and Oakwood Road flowing northward to its confluence with Fivemile Creek just east of Fivemile Road stream crossing.

4. No-name branch of Fivemile Creek from a point near Edwards Lake Road flowing in a westerly direction to its confluence with Fivemile Creek west of the Parkway East Crossing.

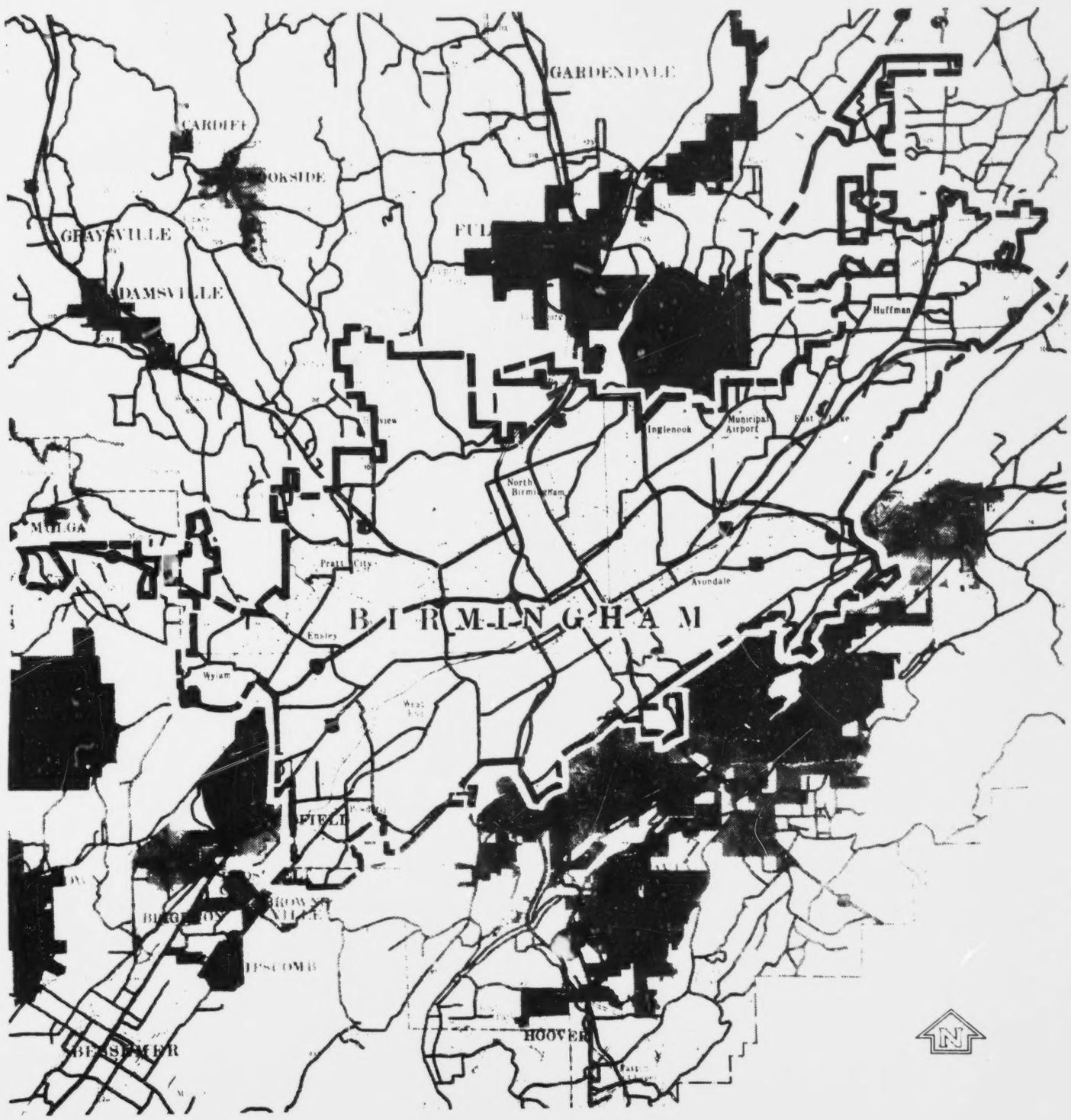

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

APPROXIMATE SCALE

2 0 2 4 6 MI.

VICINITY MAP

5. No-name branch of Spring Branch from a point near 18th Avenue and 17the Terrace flowing in a southwesterly direction to its confluence with Spring Branch west of the Carson Road Crossing.

Village Creek

1. No-name branch of Black Creek from its point of entrance into the community limits west of Cherry Avenue flowing southward to its confluence with Sayreton Road.

2. No-name branch of Village Creek from a point near Huntsville Road and the BB railway crossing flowing southward to its confluence with Village Creek just west of Huntsville Road.

3. No-name branch of Village Creek from its point of entry into the corporate limits near 69th Street flowing in a southerly direction to its confluence with Village Creek near 65th St.

Valley Creek

1. The no-name branch of the Valley Creek from a point near Highway 11 and Avenue N flowing in a southeasterly direction to its confluence with Valley Creek near 65th Street.

2. The no-name branch of Valley Creek from a pont near 48th Place flowing in a southeasterly direction to its confluence with Valley Creek near South Park Road.

3. No-name branch of Valley Creek from a point near 31st Street and Ash Avenue flowing in a northwesterly direction to its confluence with Valley Creek near Cleburn Avenue.

4. No-name branch of Nabors Branch from a point near 21st Street and College Avenue flowing in a westerly direction to its confluence with Nabors Branch near Park Avenue.

5. No-name branch of Nabors Branch from a point near Grant Avenue and 17th Street flowing in a westerly direction to its confluence with Nabors Branch, Boise Avenue and the Southern Railway.

6. No-name branch of valley Creek from a point near Wilson Road and Oak Avenue flowing in a northwesterly direction to its confluence with Valley Creek near the Southern Railway just south of Daniel Drive.

Shades Creek

1. No-name branch of Shades Creek from a point near Monteva lo Road and Leach Road flowing in a southeasterly direction to its confluence with Shades Creek south of the Grover Drive Crossing.

2. No-name branch of Shades Creek from a point near Oporto Avenue and I-20 flowing in a southerly direction to its confluence with Shades Creek near the Elder Street Crossing.

Those streams studied in detail are:

Fivemile Creek

1. The mainstream of Fivemile Creek from the Chalkville School Road crossing to its exit from the corporate limits of Birmingham.

2. Tarrant Spring Branch of Fivemile Creek (Stream 18) from the Carson Road crossing downstream to its confluence with Fivemile Creek within the corporate limits of Birmingham.

3. Dry Creek from its entry into Birmingham corporate limits near Oldspring Road downstream to its confluence with Fivemile Creek.

4. Unnamed Creek 23 from its entry into the corporate limts of Birmingham near Lawson Road to its downstream confluence with Fivemile Creek.

Village Creek

1. The mainstream of Village Creek from the Boys Industrial School downstream to its exit from the corporate limits of Birmingham.

2. Camp Branch of Village Creek (Stream 27) from the Birmingport Road crossing to its exit from the corporate limits of Birmingham 880 feet downstream from Birmingport Road.

3. Black Creek (Stream 30) branch of Village Creek from its entry into Birmingham corporate limits 1400 feet upstream of Old Pratt Highway downstream to its exit from the corporate limits of Birmingham.

4. Unnamed Creek 31 from the 1st Avenue North crossing to its downstream confluence with Village Creek wtihin Birmingham corporate limits.

5. Unnamed Creek 32 from a point 0.05 miles upstream of Brussels Avenue to its downstream confluence with Village Creek.

6. Unnamed Creek 34 from its point of flowing under a culvert near Todd Drive to its downstream confluence with Village Creek within the Birmingham corporate limits.

Valley Creek

1. The mainstream of Valley Creek from its crossing at 7th Street N. in Birmingham flowing south to its exit from the corporate limits of Birmingham.

2. Unnamed Creek 48 from the 6th Avenue SW stream crossing downstream to its confluence with Valley Creek.

3. Unnamed Creek 49 from the 6th Avenue South stream crossing to its downstream confluence with Unnamed Creek 48.

4. Nabors Branch of Valley Creek from the Louisville & Nashville railroad crossing downstream to its confluence with Valley Creek.

Shades Creek

1. The mainstream of Shades Creek from its point of entry into the Birmingham corporate limts at its border with Irondale to its downstream exit of the corporate limits of Birmingham at its border with Mountain Brook.

Flooding on smaller streams in undeveloped parts of the city and shallow flooding caused by ponding of runoff were studied by approximate methods by Gannett, Fleming, Corddry and Carpenter, Inc. The approximate study areas in some instances are superseded by this detailed study.

2.2 Community Description

Birmingham is located centrally in Jefferson County. It has an estimated population of 268,000 (1975). The 1970 census data showed a population of 300,910.

The City proper is located in a valley between a ridge of hills, extending from the northwest to the west, and the Red Mountain Range, which extends from the east to the southwest. This valley is approximately 8 miles long and 2 to 4 miles wide. The Red Mountain Range approaches a height of 600 feet above the valley level. Another ridge, the Shades Mountain Ridge, parallels the Red Mountain Range several miles to the southeast. Rolling terrain extends to the southwest and the west. The hills in the Birmingham area, which extend to the northeast and the north, are the foothills of the Appalachian Mountains and the Cumberland Plateau.

The city runs southwest to northeast. The major portion of the city, including the downtown business district and surrounding commerical, residential and industrial areas, is relatively flat. There are numerous railroad routes through the city where underpasses have been required. This has created some of the flood pockets resulting in damage to the surrounding property. Except for some isolated hilly areas the terrain in Birmingham is relatively flat with slopes less than 10 percent grade.

The major streams within the city are:

1. Fivemile Creek which rises some 2.5 miles northeast of the city limits and flows through the city of 4.5 miles and then meanders for several miles to the northwest into Locust Fork.

2. Village Creek which rises within the northeast part of the city, flows in a sourthwesterly direction through the city for 12 miles and then into Locust Fork several miles to the northwest of the city limit.

3. Valley Creek which rises within the city and flows in a southwesterly direction through the city for 6 miles and then on to the west into the Warrior River at the western boundary of Jefferson County.

4. Shades Creek, which runs along the southeastern city limits for approximately 2 miles and eventually into the Cahaba River beyond the limits of Jefferson County.

The soils in Birmingham range from moderately deep to deep clayey soils formed in limestone residium. The soils in the southeast (Shade Creek Basin) are cherty upland soils formed in chert residuum. Birmingham is principally underlain by the Pottsville formation of sandstone, shale and coal deposits.

The climate of the flood study area is typical of Jefferson County. It is moderate with mild winters and an average annual temperature of 63 degrees F. The average annual rainfall is 54 inches.

2.3 Principal Flooding Problems

The terrain of the city is relatively flat. It is highly urbanized with storm runoff directed through storm sewering to streams, sometimes exceeding the capacity of the streams to safely transport the water downstream. Flood damage to Birmingham in the flood of March 20-21, 1970 was estimated at four million dollars damage to private property and one million dollars to public property.

Figures 2-18 indicate the depth of the computed 100-year flood at several locations in the city.

2.4 Flood Protection Measures

Almost all of the City of Birmingham is storm sewered. Many of the streams carrying these storm loads have been channelized to increase their capacity to transport high flows. The runoff stormwater load in Birmingham is especially high because of the high percentage of impervious cover and extensive storm sewering throughout the city.

3.0 ENGINEERING METHODS

For flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10-, 50-, 100-, and 500-years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the drainage areas of the streams.

3.1 Hydrologic Analyses

Table 1 presents a summary of flow frequency discharge for Valley Creek, Village Creek, Fivemile Creek and Shades Creek and those tributaries studied in detail.

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods on those portions of the streams which were studied in detail with the exception of a large portion of the mainstream of Village Creek for which the Corps of Engineers study was used (see 6.0).

For the present study, a log-Pearson Type III analysis was employed. The basis for the analysis is a report entitled "Flood in Alabama, Magnitude and Frequency Based on Data through September 30, 1971," published in 1973 by C. F. Hains (Reference 1) of the USGS. In his study, Mr. Hains fitted the log-Pearson Type III distribution to the annual maximum discharges for 209 gaged sites in Alabama and 44 selected sites in adjacent states. The results of the log-Pearson analysis were regressed against such parameters as drainage area, channel slope, storage and angle of main channel. A set of equations were developed which were used to estimate flood discharges up to a 100-year recurrence interval for ungaged sites with drainage areas as small as one square mile. Since it was necessary to compute the 500-year flood discharges, standard curve-fitting techniques are applied to Hain's coefficients to estimate the appropriate 500-year recurrence interval coefficients.

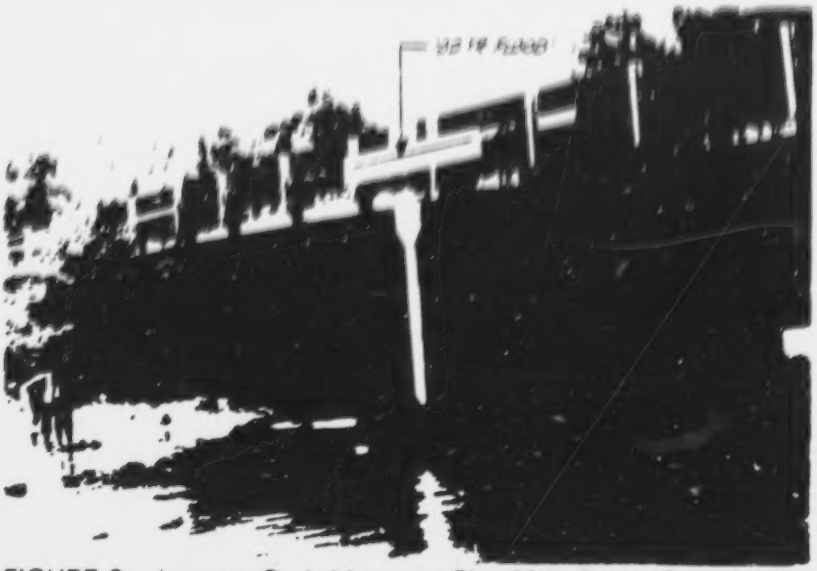

FIGURE 2: Lawson St. bridge over Five Mile Creek. Downstream face of bridge.

FIGURE 3: State Highway # 75 bridge over Five Mile Creek. Upstream face of bridge.

FIGURE 4: Carson Road bridge over Tarrant Springs Branch of Five Mile Creek. Downstream face of bridge.

FIGURE 5: Old Springville Road bridge over Dry Creek (tributary of Five Mile Creek). Upstream face of bridge.

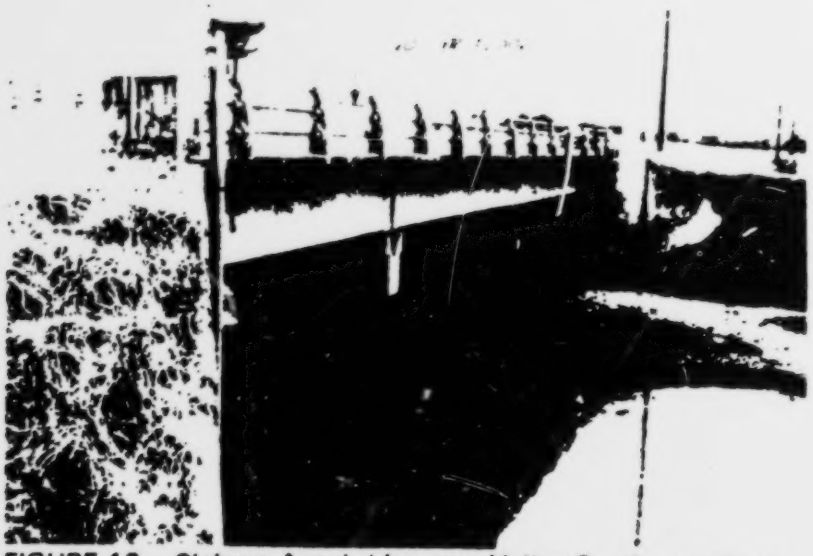

FIGURE 13: Cleburn Ave. bridge over Valley Creek Upstream face of bridge.

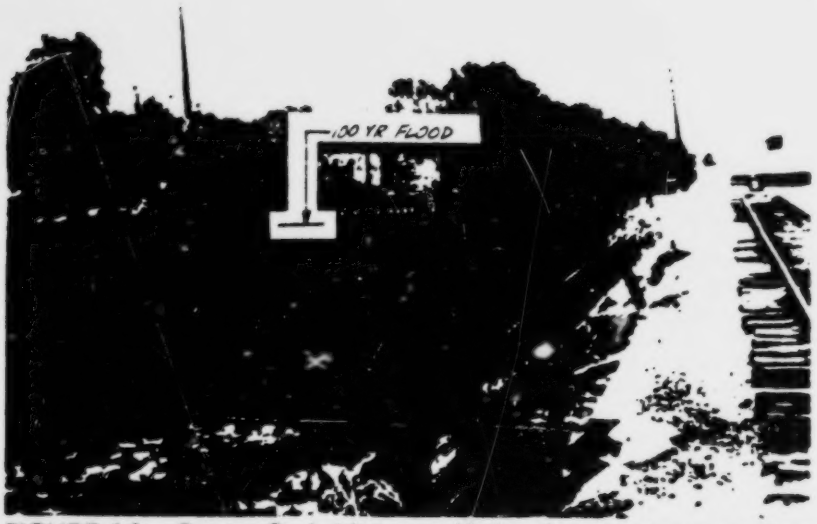

FIGURE 14: Center St. bridge over Valley Creek Upstream face of bridge.

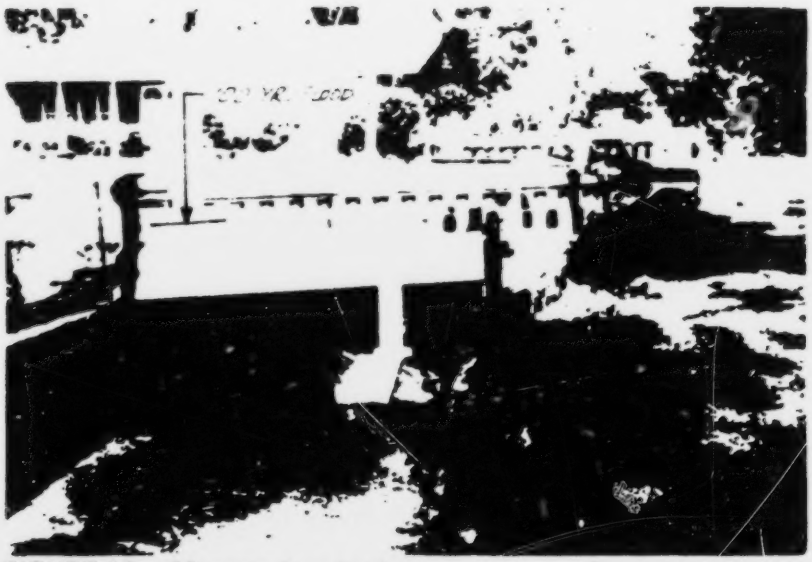

FIGURE 15: Munger Ave. bridge over unnamed tributary (Stream 48) of Valley Creek. Upstream face of bridge.

FIGURE 16: Omega St. bridge over unnamed tributary (Stream 49) of Valley Creek. Upstream face of bridge.

FIGURE 17: 31st St. bridge over Nabors Branch of Valley Creek. Upstream face of bridge.

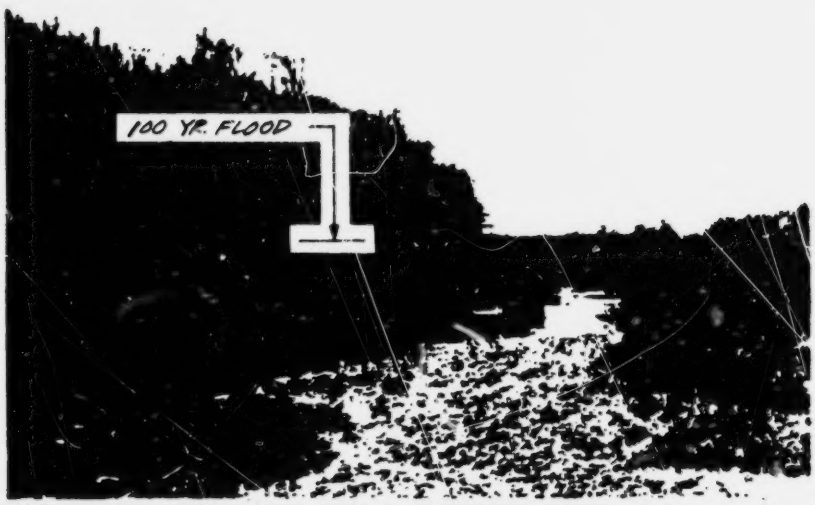

FIGURE 18: Elder St. bridge over Shades Creek. Upstream face of bridge

Hains' equations apply to rural areas. Since many of the areas in Jefferson County are urbanized, flows using these equations were adjusted. The adjustment was done by applying the procedures published by V.B. Sauer of the USGS in a report entitled "An Approach to Estimating Flood Frequencies for Urban Areas in Oklahoma," 1974 (Reference 2). The key parameters in Sauer's procedure are percent of the area storm sewered and percent impervious cover. Estimates of impervious cover were obtained by using a regression equation which relates population and employment densities to percent impervious cover. This regression equation was developed by BCM for the U.S. Environmental Protection Agency in a report entitled "Planning Methodologies for analysis of Land Use/Water Quality Relationships,: October 1976 (Reference 3). The equation was develcped with data from Pennsylvania and Oklahoma.

To determine if this equation applied in Jefferson County, Alabama, comparison estimates were made by using the equation with those obtained using a grid-counting technique on aerial photographs of Jefferson County. Ten aerial photographs were used. Each photograph covered approximately three square miles of land area. In selecting photographs for use, particular attention was paid to including all types of urban land use categories. It was found that the regression equation compared very favorably with the grid-counting technique. The average difference in the estimates is 2.5 percent, and the standard deviation of those differences is approximately 6 percent.

To learn the extent of the storm sewering, officials of Jefferson County and members of the USGS Service Office in Tuscaloosa, Alabama, were interviewed. Both groups agree that, with the exception of the City of Birmingham, storm sewering in Jefferson County is virtually non-existent. Even though storm sewering per se is not practiced outside the City of Birmingham, some improvements to drainage pattern generally occur through the process of urbanization. Other agencies doing similar studies throughout Alabama do consider improvement to drainage as an integral process of urbanization. To account for this relationship, it was assumed that the percent of the area influenced by improved drainage equals the percent of the impervious cover.

The peak discharge-drainage area relationships for the selected recurrence intervals are presented in Table I, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
FIVEMILE CREEK (FIVEMILE CREEK BASIN)					
Highway 79	22.10	6,640	10,310	12,160	17,400
Lawson Street	18.40	5,940	9,190	10,840	15,490
Wood Street	11.33	4,800	7,210	8,440	11,810
Point Road	7.09	2,990	4,710	5,580	8,060
Confluence of Dry Creek	2.79	1,640	2,560	3,030	4,380
TARRANT SPRINGS BRANCH					
Killough Springs Road	3.61	1,990	3,090	3,650	5,240
Marlin Springs Road	1.79	1,320	2,040	2,420	3,460
Carson Road	0.91	830	1,280	1,520	2,170
DRY CREEK (FIVEMILE CREEK BASIN)					
Old Springville Road	2.89	1,690	2,700	3,200	4,670
Westbridge Drive	2.25	1,410	2,260	2,680	3,930
Bruceter Road	1.38	1,000	1,600	1,910	2,790
Carraway Street	0.26	310	500	600	880
UNNAMED CREEK 23					
Lawson Road	1.39	1,160	1,770	2,070	2,890
Private Drive	1.27	1,090	1,660	1,950	2,720
VILLAGE CREEK					
Southern Railway	37.00	8,200	10,600	11,800	15,500
Highway 78	30.70	7,900	9,700	10,600	13,600
27th Street	26.00	8,000	9,900	10,800	14,000
Hayes Avenue Access Road	10.80	6,000	7,800	8,700	11,500
80th Street	5.80	4,200	5,600	6,400	8,500
West Blvd.	3.01	2,800	3,700	4,200	5,500
CAMP BRANCH					
Mulga Loop Road	7.55	1,640	2,510	2,910	3,850
Birmingport Road	6.57	1,840	2,830	3,280	4,480
BLACK CREEK (VILLAGE CREEK BASIN)					
St. Louis and San Francisco Railroad	6.57	2,670	3,520	3,940	4,990
Highway 78	2.90	1,870	2,540	2,900	3,660
Cherry Avenue	2.26	1,720	2,410	2,770	3,640

TABLE 1 - SUMMARY OF DISCHARGES-continued

UNNAMED CREEK 31					
Louisville & Nashville Railroad	4.71	3,940	5,490	6,260	8,250
10th Avenue North	4.50	3,890	5,430	6,190	8,170
Messmer-Airport Highway	4.08	3,780	5,280	6,020	7,960
1st Avenue North	3.27	3,480	4,870	5,560	7,360
UNNAMED CREEK 32					
50th Street	3.50	3,070	4,330	4,970	6,650
60th Street North	2.37	2,390	3,370	3,870	5,180
64th Place South	1.44	1,710	2,420	2,770	3,720
Louisville & Nashville Railroad	0.09	260	370	430	570
VALLEY CREEK					
Seaboard Coastline Railroad	21.27	9,690	13,660	15,710	21,000
Avenue W	12.96	8,330	11,540	13,200	17,410
8th Street S.W.	9.59	7,360	10,160	11,630	15,290
7th Street North	5.29	5,800	7,890	8,990	11,670
UNNAMED CREEK 48					
Princeton Avenue	2.44	2,250	2,970	3,270	4,430
1st Avenue	2.22	2,200	2,870	3,150	4,320
6th Avenue S.W.	0.74	1,030	1,340	1,470	2,020
UNNAMED CREEK 49					
3rd Avenue South	1.35	1,810	2,540	2,920	3,860
Omega Street	1.08	1,640	2,290	2,640	3,500
6th Avenue South	1.03	1,600	2,240	2,580	3,420
NABORS BRANCH					
Southern Railroad	3.63	2,540	3,510	4,000	5,250
24th Street S.W.	1.76	1,220	1,630	1,830	2,320
17th Street S.W.	1.03	620	760	820	900
Louisville & Nashville Railroad	0.97	580	700	750	810
SHADES CREEK					
Old Montgomery Highway	20.47	6,550	11,280	14,430	19,460
Highway 280	19.27	6,310	10,890	12,960	18,790
Mountain Brook Parkway	16.89	5,790	10,070	11,980	17,370
Old Leeds Road	14.11	4,580	7,970	9,480	13,720
Elder Street	9.36	3,440	5,290	6,190	8,630
Seaboard Coastline Railroad	6.25	2,620	3,810	4,420	6,050

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in detail.

Cross section data from the streams in that area were generally obtained from a combination of field measurements for below-water contours and photogrammetrically measured above-water contours. Cross sections were generally selected so that there would not be excessive conveyance changes between them nor more than 10 feet of flood water-surface elevation difference between them. Selected structures including all bridges, culverts, and dams with the potential of controlling flood elevations, were field surveyed to obtain elevation data and hydraulic geometry.

Roughness coefficients (Manning's "n") were generally estimated by using considerable engineering judgement in examining recent aerial and ground level photogrpahs of the structures, the flood plains, and the stream channels. Particular attention was paid to "n" values as they related to known gage stages. The streams in this community that were studied at least in part by detailed methods are as follows:

Stream Number	Stream Name	Range of Manning's "n" Values	
		Channel	Flood Plain
12000	Fivemile Creek	0.04-0.06	0.03-0.195
18000	Tarrant Springs Branch	0.03	0.06-0.15
20000	Dry Creek	0.04	0.07-0.13
23000	Unnamed Creek 23	0.04	0.09-0.13
25000	Village Creek	0.02-0.04	0.03-0.20
27000	Camp Branch	0.04	0.05-0.13
30000	Black Creek	0.04	0.10-0.13
31000	Unnamed Creek 31	0.04	0.04-0.07
32000	Unnamed Creek 32	0.03-0.04	0.04-0.10
34000	Unnamed Creek 34	0.04	0.05
35000	Valley Creek	0.04-0.06	0.03-0.18
48000	Unnamed Creek 48	0.04	0.05-0.07
49000	Unnamed Creek 49	0.04-0.05	0.07
50000	Nabors Branch	0.04	0.05-0.07
51000	Shades Creek	0.04	0.04-0.13

Water-surface profiles were developed using the HEC-2 (Reference 4) standard-step models. Profiles were determined for the 10-, 50-, 100- 500-year floods. All starting water-surface elevations were either the backwater of a stream at a confluence or the result of more than 1,000 feet of step-backwater computations. The Manning coefficients were adjusted to provide close correlation of water-surface profiles with known water surface elevation as determined from flood data taken at USGS gaging sites.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is used to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the flood elevations at each cross section; between cross sections, the boundaries were interpolated using limited planimetric maps at a scale of 1:500, with several contours in the flood plain at an approximate contour interval of five feet. Where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without

substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodway presented in this study was computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 3), the floodway widths were determined at cross sections; between cross sections, widths were interpolated and boundaries drawn. In cases where the floodway and the 100-year boundaries are close together, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 13.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Fivemile Creek (Fivemile Creek Basin)							
BW[2]	36.61	387	3,159	3.4	572.0	571.0	1.0
BZ	36.77	353	2,248	4.8	575.8	574.8	1.0
CA	37.01	459	3,256	3.2	582.5	581.5	1.0
CB	37.20	534	3,105	3.3	586.4	585.4	1.0
CC	37.38	273	2,303	4.5	589.9	588.9	1.0
CD	37.53	358	2,350	3.7	595.7	594.7	1.0
CE	37.68	123	1,102	7.8	600.3	599.3	1.0
CF	37.83	127	1,575	5.5	606.6	605.6	1.0
CG	38.02	91	1,002	8.6	612.1	611.1	1.0
CH	38.18	213	2,248	3.8	619.2	618.2	1.0
CI	38.32	51	665	13.0	627.6	626.6	1.0
CJ	38.48	131	1,508	5.7	636.8	635.8	1.0
CK	38.60	84	929	9.2	640.5	639.5	1.0
CL	38.75	97	1,251	6.8	647.0	646.0	1.0
CM[3]	38.84	247	2,600	3.2	649.9	648.9	1.0
CN[3]	39.00	60	639	12.7	659.6	658.7	0.9
CO[3]	39.14	119	1,267	6.4	667.1	666.1	1.0

[1]Miles above mouth
[2]Floodway extends beyond corporate limits
[3]Floodway outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOODWAY DATA

FIVEMILE CREEK (FIVEMILE CREEK BASIN)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (FPS)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Fivemile Creek (Fivemile Creek Basin) cont.							
CP[2]	39.26	176	2,434	3	670.4	669.4	1.0
CQ	39.35	381	3,816	2	672.4	671.4	1.0
CR	39.67	161	1,617	4	675.6	674.6	1.0
CS	39.91	206	1,610	4	677.4	676.4	1.0
CT	40.08	226	2,086	3	680.3	679.3	1.0
CU	40.20	97	1,000	5	681.7	680.7	1.0
CV	40.34	206	2,000	3	683.5	682.5	1.0
CW	40.46	240	2,000	3	685.1	684.1	1.0
CX	40.58	140	1,000	5	686.7	685.7	1.0
CY	40.70	94	758	7.4	704.6	703.6	1.0
CZ	41.42	443	3,361	1.6	712.4	711.4	1.0
DA[2]	41.62	382	1,029	5.1	714.6	713.6	1.0
DB[2]	41.82	122	637	8.1	719.3	718.3	1.0
DC	42.05	210	1,012	3.0	724.8	723.8	1.0
DD[2]	42.22	157	643	4.6	727.8	726.8	1.0
DE[2]	42.46	258	1,064	2.7	732.5	731.5	1.0
DF[2]	42.74	359	950	2.9	738.0	737.0	1.0
DG[2]	43.05	280	533	3.9	745.3	744.3	1.0

[1]Miles above mouth
[2]Floodway extends beyond corporate limits
[3]Floodway outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOODWAY DATA

FIVEMILE CREEK (FIVEMILE CREEK BASIN)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Fivemile Creek (Fivemile Creek Basin) cont.							
DH[2]	43.33	179	591	3.6	754.2	753.2	1.0
DI[2]	43.45	150	612	3.0	756.6	755.6	1.0
DJ[2]	43.63	197	463	3.6	763.1	762.1	1.0
Tarrant Springs Branch							
A	[illegible]	[illegible]	[illegible]	5.4	600.0	599.0	1.0
B	[illegible]	[illegible]	[illegible]	2.8	606.0	605.0	1.0
C	[illegible]	[illegible]	[illegible]	2.7	608.4	607.4	1.0
D	[illegible]	[illegible]	[illegible]	3.3	611.2	610.2	1.0
E	[illegible]	[illegible]	[illegible]	3.2	615.4	614.4	1.0
F	[illegible]	[illegible]	[illegible]	3.1	620.8	619.8	1.0
G	1.10	170	1,072	3.5	624.4	623.4	1.0
H	1.24	52	504	7.4	629.4	628.4	1.0
I	1.34	83	619	6.0	634.8	633.8	1.0
J[2]	1.47	233	2,044	1.8	643.1	642.1	1.0
K[2]	1.60	127	943	3.8	644.1	643.1	1.0

[1]Miles above mouth
[2]Floodway outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOODWAY DATA

FIVEMILE CREEK (FIVEMILE CREEK BASIN)
-TARRANT SPRINGS BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Dry Creek (Fivemile Creek Basin)							
D[2]	0.61	208	684	4.8	743.9	742.9	1.0
E	0.75	107	529	6.0	751.3	750.3	1.0
F[3]	0.85	32	251	12.7	756.5	756.3	0.2
G[3]	0.96	31	245	12.3	762.9	761.9	1.0
H[3]	1.07	82	327	8.3	770.7	770.7	0.0
Unnamed Creek 23							
A	0.10	242	768	3.6	581.0	580.0	1.0
B	0.21	250	939	2.9	587.4	586.4	1.0
C	0.30	114	485	4.5	593.0	592.0	1.0
D	0.42	150	735	2.9	600.3	599.3	1.0
E	0.50	123	456	4.7	605.8	604.8	1.0
F	0.60	172	717	3.0	611.6	610.6	1.0
G[2]	0.70	78	352	5.9	620.3	619.3	1.0
H[3]	0.77	70	361	5.7	626.2	625.2	1.0
I[3]	0.84	45	256	8.0	631.2	630.2	1.0
J[3]	0.91	110	670	2.9	637.1	636.1	1.0

[1]Miles above mouth
[2]Floodway extends beyond corporate limits
[3]Floodway outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOODWAY DATA

DRY CREEK (FIVEMILE CREEK BASIN)-UNNAMED CREEK 23

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (FPS)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Tarrant Springs Branch (cont.)							
L[2]	1.78	70	463	7.3	650.7	649.7	1.0
M[2]	2.01	117	705	3.9	658.1	657.1	1.0
N	2.21	80	369	7.4	666.4	665.4	1.0
O[2]	2.44	45	300	8.7	676.5	675.5	1.0
P	2.56	105	453	5.5	680.2	679.2	1.0
Q[2]	2.69	35	235	10.5	686.7	686.5	0.2
R[2]	2.81	103	46	5.3	690.1	689.1	1.0
S[2]	2.93	65	178	13.6	696.7	695.7	1.0
T[2]	3.00	70	152	15.2	700.7	700.4	0.3
U	3.07	36	235	9.7	706.1	705.6	0.5
V	3.15	37	234	9.7	710.4	709.4	1.0
Dry Creek (Fivemile Creek Basin)							
A	0.22	68	451	7.9	731.3	730.4	0.9
B[3]	0.35	253	875	4.0	734.7	733.7	1.0
C[3]	0.48	481	840	4.2	738.9	737.9	1.0

[1]Miles above mouth
[2]Floodway outside corporate limits
[3]Floodway extends beyond corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOODWAY DATA

TARRANT SPRINGS BRANCH–
DRY CREEK (FIVEMILE CREEK BASIN)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Village Creek							
N[2]	24.48	249	4,369	4.9	513.0	512.0	1.0
O[2]	25.03	655	9,361	1.8	514.8	513.8	1.0
P[2]	25.88	441	7,275	2.2	515.9	514.9	1.0
Q[2]	26.58	205	2,887	4.1	516.9	515.9	1.0
R	27.11	90	1,666	7.1	518.1	517.1	1.0
S	27.29	130	2,923	4.0	519.3	518.3	1.0
T	27.91	103	1,658	7.1	521.9	520.9	1.0
U	28.37	1,538	10,352	1.0	523.4	522.4	1.0
V	28.65	803	5,740	1.8	523.8	522.8	1.0
W	29.05	300	2,604	4.0	524.0	523.0	1.0
X	29.16	104	1,313	8.0	525.2	524.2	1.0
Y	29.72	90	1,138	9.2	529.5	528.5	1.0
Z	30.08	105	1,122	9.4	532.6	531.6	1.0
AA	30.57	469	1,934	5.5	538.4	538.2	0.2
AB	30.95	626	4,909	2.2	541.9	541.7	0.2
AC	31.16	694	4,618	2.3	543.1	542.1	1.0
AD	31.74	463	3,711	2.9	546.5	545.5	1.0
AE	32.14	96	1,220	8.7	549.4	548.4	1.0
AF	32.58	442	3,310	3.2	555.9	555.3	0.6

[1]Miles above mouth
[2]Floodway outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOODWAY DATA

VILLAGE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Village Creek (cont.)							
AG	32.92	243	1,265	8.5	559.6	558.6	1.0
AH	33.42	232	1,373	7.9	567.0	566.0	1.0
AI	33.75	1,044	6,087	1.8	569.4	568.4	1.0
AJ	34.03	830	6,008	1.8	573.2	572.2	1.0
AK	34.51	122	1,284	10.4	577.9	577.3	0.6
AL	34.93	463	2,659	4.1	583.8	582.8	1.0
AM	35.15	943	6,548	1.7	585.7	584.7	1.0
AN	35.48	770	2,399	4.5	588.0	587.0	1.0
AO	35.79	573	3,889	2.7	592.7	591.7	1.0
AP	36.08	580	4,448	2.0	594.6	593.6	1.0
AQ	36.55	520	1,409	6.2	600.2	599.2	1.0
AR	36.80	635	2,304	3.1	604.5	603.5	1.0
AS	37.11	150	762	10.8	606.5	605.9	0.6
AT	37.35	473	1,560	5.3	610.4	609.4	1.0
AU	37.82	449	2,159	3.7	620.6	619.6	1.0
AV	38.28	624	3,284	1.9	630.5	629.5	1.0
AW	38.48	152	1,155	5.5	633.6	632.6	1.0
AX	38.92	66	563	10.3	640.6	639.6	1.0
AY	39.29	261	1,679	3.3	650.0	649.4	0.6

[1]Miles above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOODWAY DATA

VILLAGE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Village Creek (cont.)							
AZ	39.72	244	1,401	3.0	657.9	657.4	0.5
BA	39.82	563	3,867	1.1	658.9	657.9	1.0
BB	39.98	463	1,767	2.1	659.3	658.3	1.0
BC	40.10	86	396	9.4	662.5	661.5	1.0
BD	40.22	360	1,141	3.2	665.5	664.5	1.0
BE	40.35	174	538	3.9	667.2	666.2	1.0
BF	40.37	85	286	7.3	669.0	668.0	1.0
Camp Branch							
A[2]	1.05	300	5,726	0.5	508.9	508.9	0.0
B[2]	1.68	352	5,672	0.7	509.9	508.9	1.0
C[2]	2.14	111	1,440	2.9	510.4	509.4	1.0
Black Creek (Village Creek Basin)							
C[2]	0.68	268	3,623	1.1	519.1	518.9	0.2
D	1.03	163	1,714	2.5	520.0	519.5	0.5

[1]Miles above mouth
[2]Floodway outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOODWAY DATA

VILLAGE CREEK-CAMP BRANCH-BLACK CREEK (VILLAGE CREEK BASIN)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Black Creek (Village Creek Basin) cont.							
E	1.42	68	605	7.2	524.6	523.6	1.0
F[2]	1.88	490	4,706	1.0	527.4	526.4	1.0
G	2.22	197	1,874	2.2	528.4	527.4	1.0
H	2.47	470	2,829	1.4	529.7	528.7	1.0
I	2.78	170	1,828	1.6	537.4	536.4	1.0
J	3.07	297	3,863	0.7	545.3	544.3	1.0
K	3.37	507	4,682	0.6	545.4	544.4	1.0
L	3.52	257	1,959	1.4	545.9	544.9	1.0
M	3.72	49	340	8.1	554.8	554.8	0.0
N	3.89	302	1,525	1.8	559.9	558.9	1.0
Unnamed Creek 31							
A	0.39	45	511	12.2	584.8	583.8	1.0
B	0.70	464	1,886	3.3	589.7	588.7	1.0
C	0.92	340	1,581	3.9	593.3	592.3	1.0
D	1.04	515	2,869	2.2	594.8	593.8	1.0
E	1.20	459	989	6.1	596.2	595.2	1.0

[1]Miles above mouth
[2]Floodway outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOODWAY DATA

BLACK CREEK (VILLAGE CREEK BASIN)–UNNAMED CREEK 31

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Unnamed Creek 31 (cont.)							
F	1.25	480	1,046	5.8	597.9	596.9	1.0
G	1.45	293	1,720	3.3	603.5	602.5	1.0
Unnamed Creek 32							
A	0.38	130	518	9.8	599.2	598.2	1.0
B	0.69	530	2,625	1.9	606.1	605.1	1.0
C	0.95	160	1,014	4.6	612.8	611.8	1.0
D	1.08	162	555	7.7	616.0	615.0	1.0
E	1.23	205	840	4.6	620.5	619.5	1.0
F	1.39	291	1,245	3.1	621.4	620.4	1.0
G	1.52	157	525	7.2	623.5	622.5	1.0
H	1.68	275	820	3.6	630.0	629.0	1.0
I	1.86	129	485	6.1	634.9	633.9	1.0
J	2.03	38	305	9.4	638.6	637.6	1.0
K	2.22	31	229	12.2	644.5	643.9	0.6
L	2.36	20	184	14.8	649.3	648.3	1.0

[1]Miles above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOODWAY DATA

UNNAMED CREEK 31-UNNAMED CREEK 32

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Unnamed Creek 34							
A	0.12	200	466	6.2	671.4	670.4	1.0
B	0.28	195	724	3.5	677.3	676.3	1.0
C	0.46	178	597	4.6	682.5	681.5	1.0
D	0.55	119	381	7.1	685.2	684.2	1.0
E	0.65	18	199	13.2	689.0	688.0	1.0
F	0.76	56	287	8.9	694.3	693.3	1.0
Valley Creek							
BD[2]	47.42	215	1,869	8.6	506.3	505.3	1.0
BE[2]	47.76	500	4,192	3.8	510.8	509.8	1.0
BF	48.09	744	6,645	2.3	517.6	516.6	1.0
BG	48.46	913	7,722	2.0	518.3	517.3	1.0
BH	49.19	545	4,647	2.9	525.5	524.5	1.0
BI	49.49	527	2,935	4.6	527.6	526.6	1.0
BJ	49.79	283	2,954	4.6	530.2	529.2	1.0
BK	50.17	700	3,272	4.1	532.3	531.3	1.0
BL	50.43	553	3,543	3.8	534.3	533.3	1.0
BM	50.77	225	1,721	7.7	537.2	536.2	1.0

[1]Miles above mouth
[2]Floodway outside corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOODWAY DATA

UNNAMED CREEK 34-VALLEY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Valley Creek (cont.)							
BN	51.06	360	2,209	5.9	540.9	539.9	1.0
BO	51.38	312	2,409	5.4	544.6	543.6	1.0
BP	51.62	490	3,734	3.4	547.0	546.0	1.0
BQ	51.84	415	2,348	5.3	548.3	547.3	1.0
BR	52.08	752	3,581	3.5	551.1	550.1	1.0
BS	52.32	512	2,539	4.6	552.9	551.9	1.0
BT	52.59	84	1,701	6.6	555.3	554.3	1.0
BU	52.80	84	1,027	10.8	557.9	556.9	1.0
BV	52.98	340	2,470	3.9	561.4	560.4	1.0
BW	53.22	330	3,273	2.9	562.8	561.8	1.0
BX	53.49	479	3,392	2.8	565.2	564.2	1.0
BY	53.70	65	799	11.5	566.8	565.8	1.0

[1]Miles above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOODWAY DATA

VALLEY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Nabors Branch							
A	0.23	150	924	4.3	521.6[2]	521.1[2]	0.5
B	0.44	112	937	3.2	525.4	524.4	1.0
C	0.62	87	547	5.5	526.9	525.9	1.0
D	0.83	399	1,569	1.8	529.3	528.3	1.0
E	0.97	82	316	5.8	531.3	530.3	1.0
F	1.10	279	627	2.7	534.8	533.8	1.0
G	1.56	21	123	9.4	546.2	545.9	0.3
H	1.59	120	450	2.6	548.7	547.7	1.0
I	1.63	44	175	5.8	550.1	549.1	1.0
J	1.66	69	306	3.3	551.0	550.0	1.0
K	1.76	20	113	8.0	551.6	550.6	1.0
L	1.84	19	128	6.8	554.6	553.6	1.0
M	1.91	14	101	8.3	556.9	555.9	1.0
N	1.97	28	171	4.8	559.3	558.3	1.0
O	2.00	130	443	1.9	562.3	561.3	1.0
P	2.04	85	248	3.2	562.4	561.4	1.0
Q	2.06	23	124	6.3	563.5	562.5	1.0

[1]Miles above mouth
[2]Elevation computed without consideration of backwater effects

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOODWAY DATA

NABORS BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Shades Creek							
CP[2]	50.13	111	1,311	5.3	688.1	687.1	1.0
CQ[2]	50.46	495	4,695	1.5	690.3	689.3	1.0
CR[2]	50.60	543	4,019	1.7	690.4	689.4	1.0
CS	50.87	293	2,277	3.0	691.3	690.3	1.0
CT	51.25	220	2,138	2.9	694.0	693.0	1.0
CU	51.98	224	1,674	3.6	700.2	699.2	1.0
Unnamed Creek 45							
A	0.73	542	3841	0.5	524.2	525.2	1.0
B	0.88	162[2]	750	2.5	526.1	527.1	1.0

[1]Miles above mouth
[2]Floodway extends beyond corporate limits

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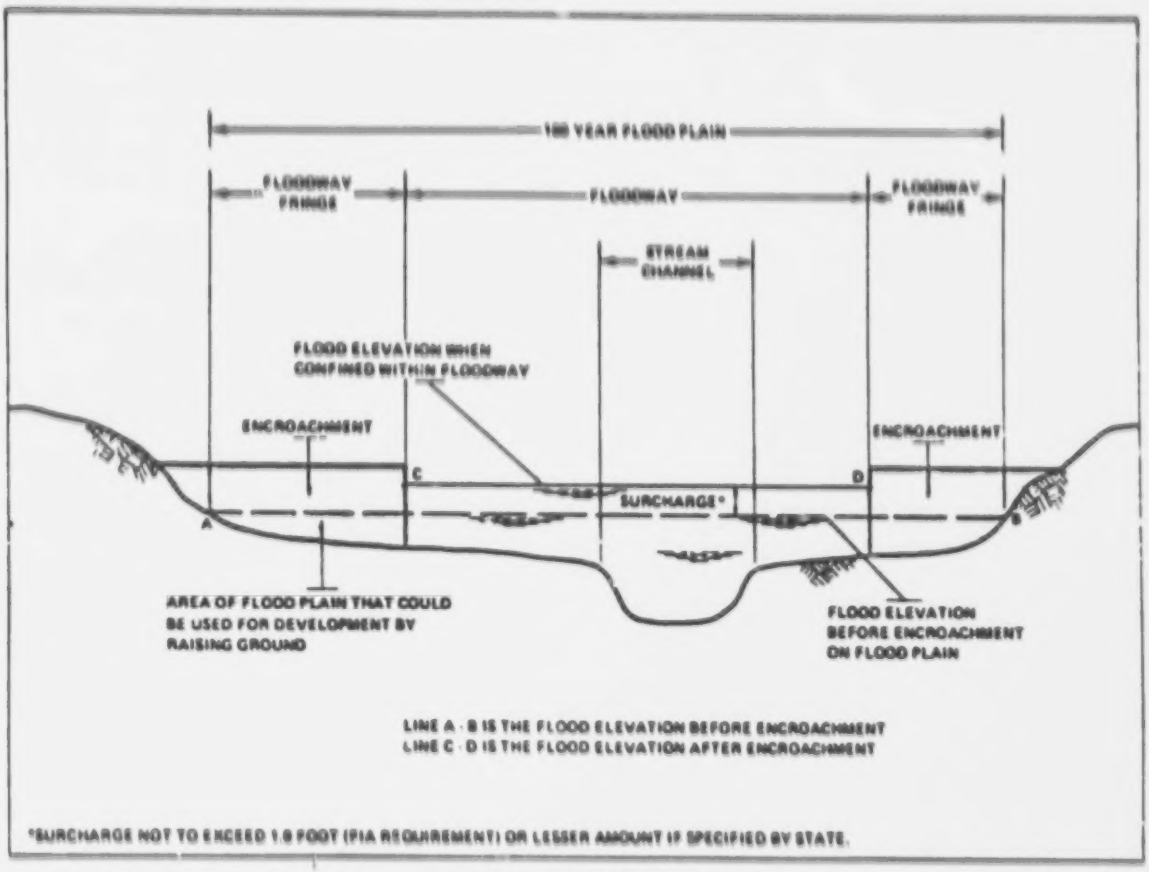
TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOODWAY DATA

SHADES CREEK—UNNAMED CREEK 45


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 19

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source studied in detail affecting the City of Birmingham.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet

5.2 Flood Hazard Factors (FHFs)

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of Birmingham was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.

Zone A0:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown, but no Flood Hazard Factors are determined.
Zones A1, A2, A3, A4, A5, A6, A8, A9, A11:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevation for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Birmingham is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR)	2% (50 YR)	0.2% (500 YR)			
Fivemile Creek (Fivemile Creek Basin)							
Reach 1	0008,0009, 0010	-2.55	-0.72	+1.71	025	A5	Varies
Reach 2	0010	-1.05	-0.32	+0.53	010	A2	Varies
Tarrant Springs Branch							
Reach 1	0004,0008, 0009	-2.13	-0.63	+1.44	020	A4	Varies
Dry Creek (Fivemile Creek Basin)							
Reach 1	0010	-1.10	-0.27	+0.56	010	A2	Varies
Unnamed Creek 23							
Reach 1	0008	-1.02	-0.30	+0.73	010	A2	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD INSURANCE ZONE DATA

FIVEMILE CREEK (FIVEMILE CREEK BASIN)-TARRANT SPRINGS BRANCH-DRY CREEK (FIVEMILE CREEK BASIN)-UNNAMED CREEK 23 4/

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Village Creek							
Reach 1	0022,0023, 0033,0034	-3.93	-1.16	+3.43	040	A8	Varies
Reach 2	0025,0026, 0034,0035	-2.00	-0.60	+1.68	020	A4	Varies
Reach 3	0016,0017, 0026,0027, 0028	-1.13	-0.32	+0.88	010	A2	Varies
Reach 4	0017,0028	-1.63	-0.49	+1.05	015	A3	Varies
Reach 5	0017	-2.04	-0.71	+1.49	020	A4	Varies
Reach 6	0017,0018	-1.02	-0.32	+0.74	010	A2	Varies
Camp Branch							
Reach 1	0021	-3.75	-1.15	+3.10	040	A8	Varies
Black Creek (Village Creek Basin)							
Reach 1	0023	-3.19	-1.00	+2.59	030	A6	Varies
Reach 2	0023	-1.85	-0.54	+1.09	020	A4	Varies
Reach 3	0023,0024	-5.37	-1.98	+4.80	055	A11	Varies
Reach 4	0024	-2.09	-0.73	+2.70	020	A4	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD INSURANCE ZONE DATA

VILLAGE CREEK-CAMP BRANCH-BLACK CREEK (VILLAGE CREEK BASIN)

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Unnamed Creek 31							
Reach 1	0026,0036, 0037	-0.91	-0.26	+0.67	010	A2	Varies
Unnamed Creek 32							
Reach 1	0027,0028	-1.15	-0.34	+0.85	010	A2	Varies
Unnamed Creek 34							
Reach 1	0018	-0.75	-0.25	+0.54	010	A2	Varies
Reach 2	0018	-2.40	-0.55	+0.95	020	A4	Varies
Valley Creek							
Reach 1	0034, 0035,0041, 0042,0046	-2.54	-0.80	+1.63	025	A5	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD INSURANCE ZONE DATA

43

UNNAMED CREEK 31-UNNAMED CREEK 32-
UNNAMED CREEK 34-VALLEY CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
NABORS BRANCH							
REACH 1	0441,0042.0045	−0.77	−0.23	0.41	010	A2	VARIES—SEE MAP
SHADES CREEK							
REACH 1	0038	−4.74	−1.17	2.76	045	A9	VARIES—SEE MAP
REACH 2	0038,0039	−2.14	−0.59	1.25	020	A4	VARIES—SEE MAP
UNNAMED CREEK 45							
REACH 1	0046,0047	−1.2	−0.2	0.5	010	A2	VARIES—SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

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TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOOD INSURANCE ZONE DATA

NABORS BRANCH—SHADES CREEK—UNNAMED CREEK 45

6.0 OTHER STUDIES

A Flood Plain Information Study for Fivemile Creek was published by the COE in 1969 (Reference 5). The study related the flood situation in the portions of the watershed outside the city limits and did not include the development of flood plain mapping or flood profiles within the City of Birmingham.

The USGS prepared a flood report on Fivemile Creek after the heavy rains of March 19-20, 1970 (Reference 6). Their hydrology was based on a rural land use for the entire basin. As a result of the rural land approach, the return frequency of a given storm is less frequent than that indicated by this study. Subsequent contacts were made with the USGS. They agreed that the return frequency interval (probability of occurrence) published in their report should be decreased because of the urban nature of the upper regions of the Fivemile Creek basin.

A flood frequency analysis was performed by Betz-Converse-Murdoch-Inc. for 21 years of flood data at the USGS stream gage on Fivemile Creek at Ketona (02457000) located 0.2 miles upstream from the western boundary of the City of Birmingham. Flow rates computed as part of the present study are greater than those indicated by the analysis of the Ketona gage. A representative of the USGS indicated that the flow rates computed by BCM should be more reliable than those based solely on a statistical analysis of this gage (Reference 7). The flows calculated by BCM represent current watershed conditions, while the gage data were recorded during a period of changing land use conditions in the watershed. Secondly, 21 years of record is not considered a satisfactory length of time to base estimates of high magnitude low frequency flood events.

The COE (Mobile District) is conducting a flood study for approximately 20 miles of the main stem of Village Creek extending from West Boulevard in Birmingham downstream to Bayview Lake.

The hydrology and hydraulics of this Corps Study received from the COE Mobile District on March 7, 1977 and updated per phone communication through December 1978 were examined and found appropriate to utilize in this study. The hydraulics were extended to provide water surface profiles approximately 2-1/2 miles downstream in Bay View Lake using the HEC-II computer program.

The methodology previously described in Section 3.0 was utilized for hydrology and hydraulics predictions for tributaries to Village Creek main stem which were studied in detail.

The USGS prepared a flood report on Valley Creek after the heavy rains of March 19-20, 1970 (Reference 6). Their hydrology was based on a rural land use for the entire basin. As a result of the rural land approach, the return frequency of a given storm is less frequent than that indicated by this study. This is most significant in the upper reaches of Valley Creek basin, which are highly urbanized. Subsequent contacts were made with the USGS. They agree that the return requency interval (probability of occurrence) should be decreased because of the increasing urban nature of the upper regions of the Valley basin (Reference 7).

In the lower portion of Valley Creek basin, a flood frequency analysis was performed by Betz-Converse-Murdoch-Inc. for 24 years of record of flood data (1954 through 1977 at the Oak Grove Gaging Station). There was good correlation between the flood frequency analysis of gage data and the results of the hydrologic analysis for this study.

The Mobile District of the COE has prepared a "Special Flood hazard Information Report on Shades Creek in the Vicintiy of Birmingham, Alabama," October 1974 (Reference 8). The information for that report was prepared from a survey study on Shades Creek, The data used were based on information available on existing conditions through June 1973.

The study data in this Flood Insurance Report were based on more recent data; aerial - 1974 and field data - 1977.

The USGS in cooperation with the Geological Survey of Alabama has prepared a study entitled "Urbanization and Flooding in Shades Creek Basin, Jefferson County, Alabama,: December 1976 (Reference 9).

The flood levels and limits of the report are much higher and larger than those limits presented in this Flood Insurance Study because of the high degree of future urbanization projected in the USGS report.

The urbanization in this Flood Insurance Report reflect current conditions and very little projected urbanization.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Emergency Management Agency, insurance and Mitigation Division, 1375 Peachtreet St., N.E. Atlanta, Georgia, 30309.

8.0 BIBLIOGRAPHY AND REFERENCES

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6. Causseaux, K. W. Flood of March 19-20, 1970, Metropolitan Birmingham and Jefferson County, Alabama, U.S. Geological Survey, Water Resoruces Division, USGS Quad Sheets, 1970.

7. Oral Communication, Mr. Roy Bingham, USGS Hydrologist, Tuscaloosa, Alabama, 12/19/78.

8. U.S. Army Corps of Engineers, Sepcial Flood Hazard Information Report on Shades Creek in the Vicinity of Birmingham, Alabama, October 1974.

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Chow, V. T. Open-Channel Hydraulics, McGraw-Hill, 1959.

U.S. Geological Survey. Hydrologic Unit Map-1974, State of Alabama, Scale 1:500,000.

U.S. Geological Survey. Quadrangle maps, Revised 1970.

9.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at the City of Birmingham, Alabama, Community Planning Dept., 710 N. 20th Street, Birmingham, Alabama 35203.

9.1 First Revision (Revised September 18, 1987)

a. Acknowledgments

The data for this Revision Description were obtained from the Flood Insurance Study for the City of Brownville, Jefferson County, Alabama (Reference 10). The Federal Emergency Management Agency (FEMA) reviewed and accepted these data for purposes of this revision.

b. Scope

Due to the recent annexation of the City of Brownville by the City of Birmingham, all flood delineations and data previously shown in the Flood Insurance Study for the City of Brownville have been updated and delineated in the Flood Insurance Study for the City of Birmingham, Jefferson County, Alabama.

c. Hydrologic and Hydraulic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods on those portions of Unnamed Creek 45 studied in detail. The peak discharge-drainage area relationships for the selected concurrence intervals are presented in Table 4, Revised Summary of Discharges.

Analysis of the hydraulic characteristics of Unnamed Creek 45 in the City of Birmingham was performed to provide estimates of the elevations of floods of the selected recurrence intervals along the stream. Cross-section data from the stream were generally obtained from a combination of field measured below-water sections and above-water section photogrammetrically measured above-water contours.

TABLE 4 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
UNNAMED CREEK 45 at Jefferson Avenue	1.03	1,050	1,600	1,880	2,630

d. Floodways

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed and are presented in Table 7, Floodway Data.

e. References and Bibliography

10. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Brownville, Jefferson County, Alabama, July 1980.

9.2 Second Revision (Revised January 17, 1990)

a. Acknowledgments

The hydrologic and hydraulic analyses for this Revisions Description were performed by the Walter Schoel Engineering Company. FEMA reviewed and accepted these data for purposes of this revision.

b. Scope

The hydrologic analyses for Unnamed Creeks 48 and 49 were revised based upon updated methods and additional years of stream flow data since the original Flood Insurance Study was prepared. The hydraulic analyses for Unnamed Creeks 48 and 49 were also revised due to the installation of culverts along the reaches of both streams that were previously studied in detail. The revised analyses resulted in the removal of the floodway and profile for both streams, which are now designated as areas of shallow flooding.

The base flood elevations for the downstream portion of Unnamed Creek 48 were revised to better reflect the overflow effects from Valley Creek.

In addition, the names of Unnamed Creeks 48 and 49 were revised to Jail Branch and Jail Branch Tributary, respectively.

c. Hydrologic and Hydraulic Analyses

The hydrologic analyses were revised based upon D.A. Olin's Magnitude and Frequency of Floods in Alabama (Reference 11), published in 1985. Olin's report supersedes C.F. Hains' Floods in Alabama (Reference 12), published in 1973, which was used for the original Flood Insurance Study. Olin's report also utilized additional years of stream flow data compared to Hains' report. The Olin report determines stream flow in urbanized drainage basins based upon the size of the drainage area and the percentage of impervious area in the basin. Impervious areas for this revision were estimated based upon field examination and grid counting techniques using City of Birmingham topographic maps (Reference 13). The percentage of impervious area was found to fall within the limits used in the Olin report.

The discharges for the 10-, 50-, and 100-year frequency floods for Jail Branch and Jail Branch Tributary were determined directly from the Olin report. The discharges for the 500-year frequency flood were extrapolated based upon a Log-Pearson Type III distribution.

The discharges were then modified due to ponding storage just upstream of the Norfolk Southern Railway bridge. Storm hydrographs were generated using the HEC-1 computer program (Reference 14), and a rating curve for the bridge culvert was developed using the HEC-2 step-backwater computer program (Reference 15) for flow rates varying from the 10- to 500-year frequency flood. The volume of storage upstream of the bridge was found, and the resulting storage versus outflow relationship was used to perform the final storage routing using the HEC-1 program.

The revised discharges are shown in Table 5, Revised Summary of Discharges.

The hydraulic analyses for Jail Branch and Jail Branch Tributary were revised to reflect the installation of culverts along both streams from their mouth upstream to 6th Avenue, and to reflect the revised discharges.

Culvert geometry for cross sections was obtained from City of Birmingham plans, except in some areas which were field surveyed. Ground elevations in the overbank areas were determined using City of Birmingham topographic maps (Reference 13) at some cross sections, and were field surveyed at others.

The starting water-surface elevations for both streams were found using the slope-area method.

The roughness coefficients (Manning's "n") for the channels of the streams was 0.013, reflecting flow in the concrete culvert, and for the overbank areas, 0.05.

Water-surface elevations for floods of the selected recurrence intervals were found using the HEC-2 step-backwater computer program (Reference 15). Because the 50-, 100-, and 500-year frequency discharges for both streams are not contained totally within the culverts, special techniques were used to obtain a proper hydraulic model. A detailed explanation of these techniques is contained in the study report prepared by the Walter Schoel Engineering Company (Reference 16) for this revision.

As a result of the revised analyses, the flooding designation along Jail Branch, upstream of Cotton Avenue and along the entire reach of Jail Branch Tributary, was revised to a shallow flooding designation and the flood profiles have been removed.

The water-surface elevations for Jail Branch from its mouth to just downstream of Cotton Avenue were revised to better reflect the overflow effects from Valley Creek.

The revised flood boundaries for both streams were delineated using City of Birmingham topographic maps at a scale of 1:1200, with a contour interval of 1 foot (Reference 13).

TABLE 5 - REVISED SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
JAIL BRANCH					
at mouth	2.73	2,075	2,643	2,913	3,620
at Norfolk Southern Railway	2.35	1,841	2,648	3,073	4,007
at Fourth Court	1.01	1,034	1,487	1,727	2,252
JAIL BRANCH TRIBUTARY					
at mouth	1.20	1,147	1,651	1,915	2,498
at Omega Street	1.11	1,083	1,558	1,807	2,357
at Gamma Street	1.03	1,028	1,480	1,717	2,239

d. Floodways

Because Jail Branch and Jail Branch Tributary were redesignated as ares of shallow flooding, the floodways, cross sections, and Floodway Data Tables for both streams were removed from this Flood Insurance Study.

e. Insurance Application

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. A revised zone designation was added to this study as follows:

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 foot and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

f. Other Studies

These revisions to Jail Branch and Jail Branch Tributary are contained entirely within the corporate limits of the City of Birmingham and do not affect any contiguous communities.

g. References and Bibliography

11. U.S. Department of the Interior, Geological Survey, Magnitude and Frequency of Floods in Alabama, D.A. Olin, 1985.

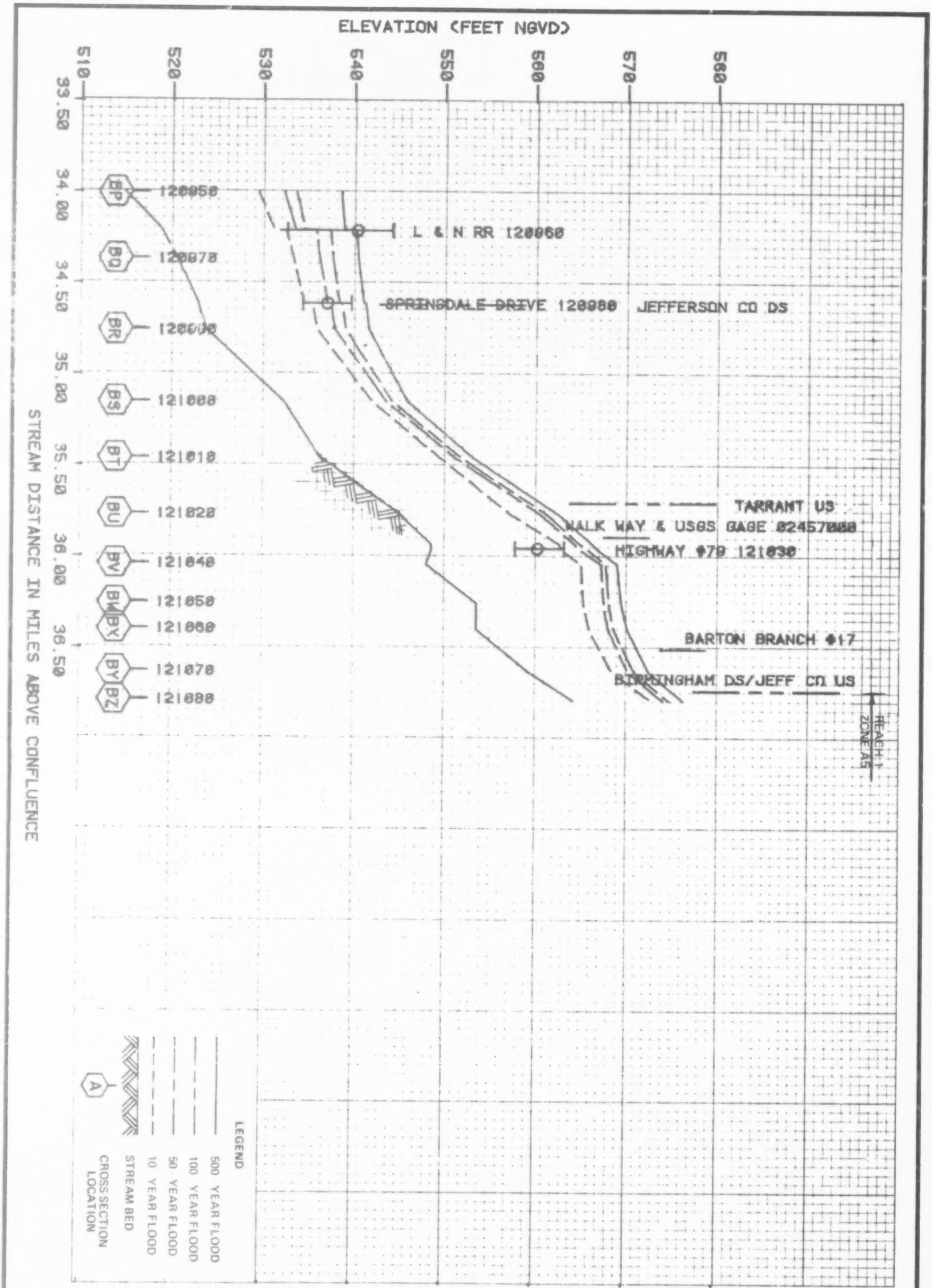
12. U.S. Geological Survey and Alabama Highway Department, C.F. Hains, Floods in Alabama, Magnitude and Frequency, Based on Data through September 30, 1971, 1973.

13. Atlantic Aerial Surveys, Inc., City of Birmingham, Alabama, Department of Engineering & Construction, Topographic Maps, Scale 1:1200, Contour Interval 1 foot, prepared by photogrammetric methods from aerial photographs dated March 1984.

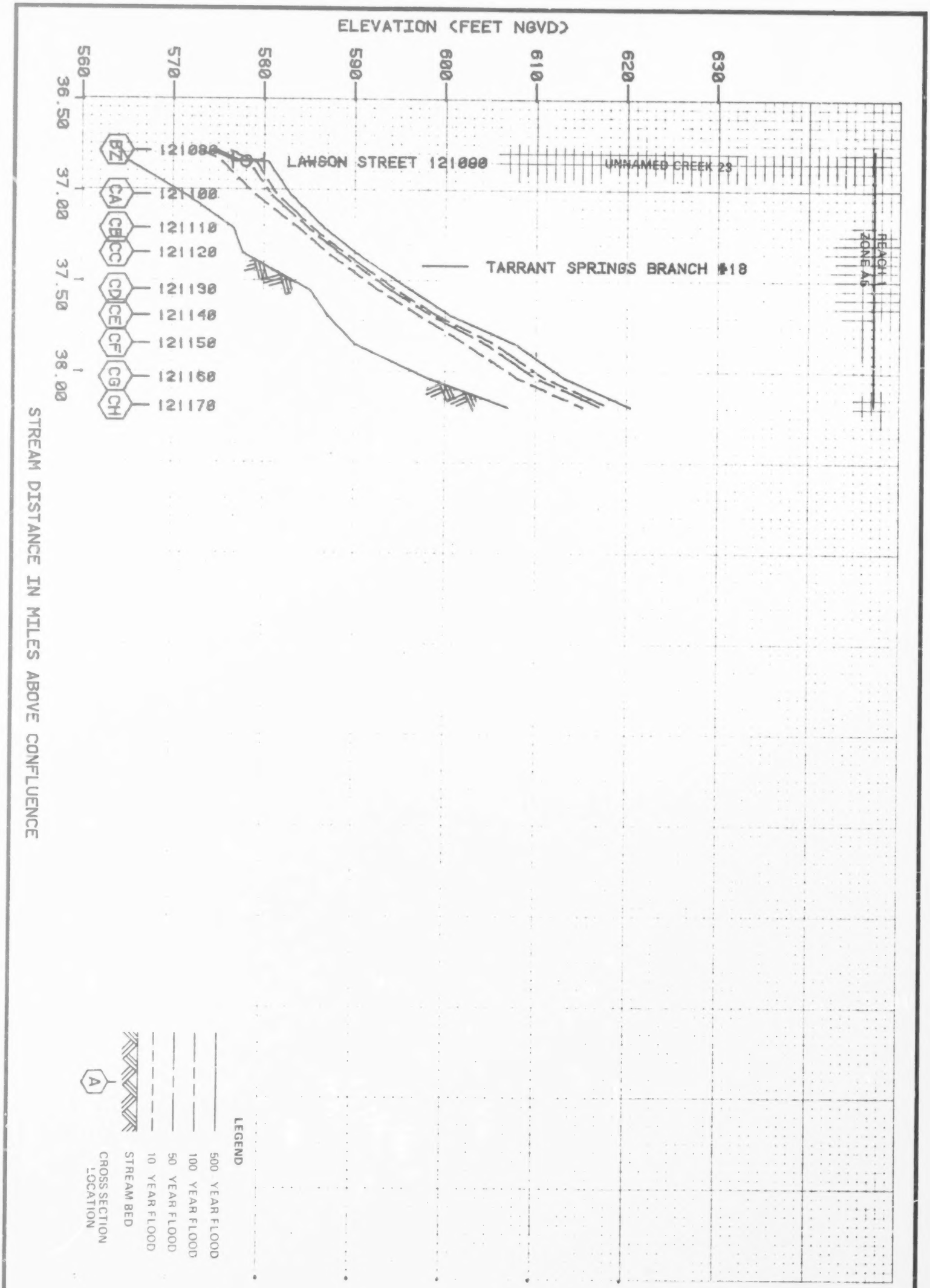
14. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-1 Flood Hydrograph Package, Computer Program 823-X6-L2610, Davis, California, September 1981, revised January 1985.

15. ----------, HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A, Davis, California, April 1984.

16. Walter Schoel Engineering Company, Flood Insurance Study of Jail Branch for the City of Birmingham, Alabama, June 1986.



01P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES FIVEMILE CREEK (FIVEMILE CREEK BASIN)



02P

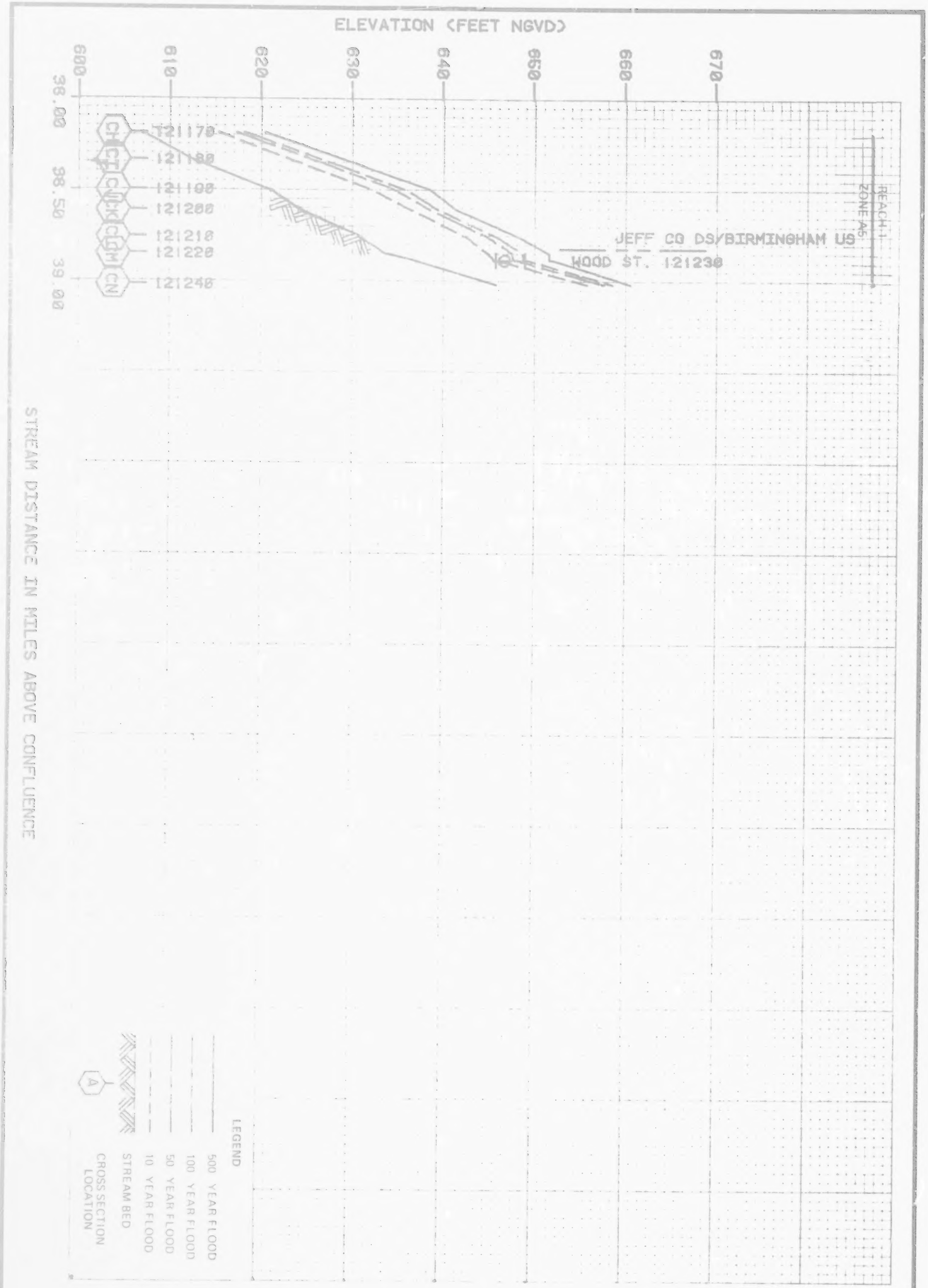
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD PROFILES

FIVEMILE CREEK (FIVEMILE CREEK BASIN)



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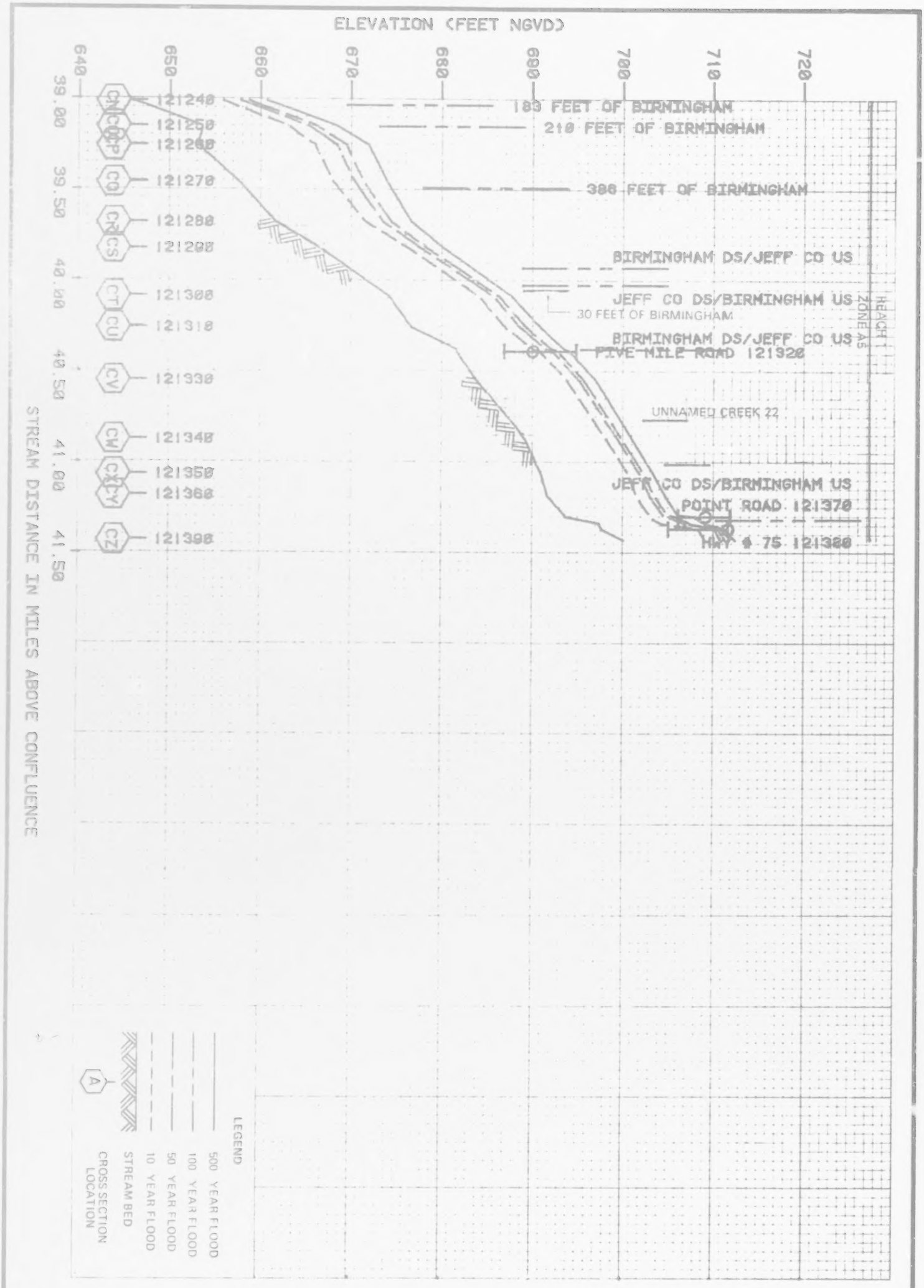


04P

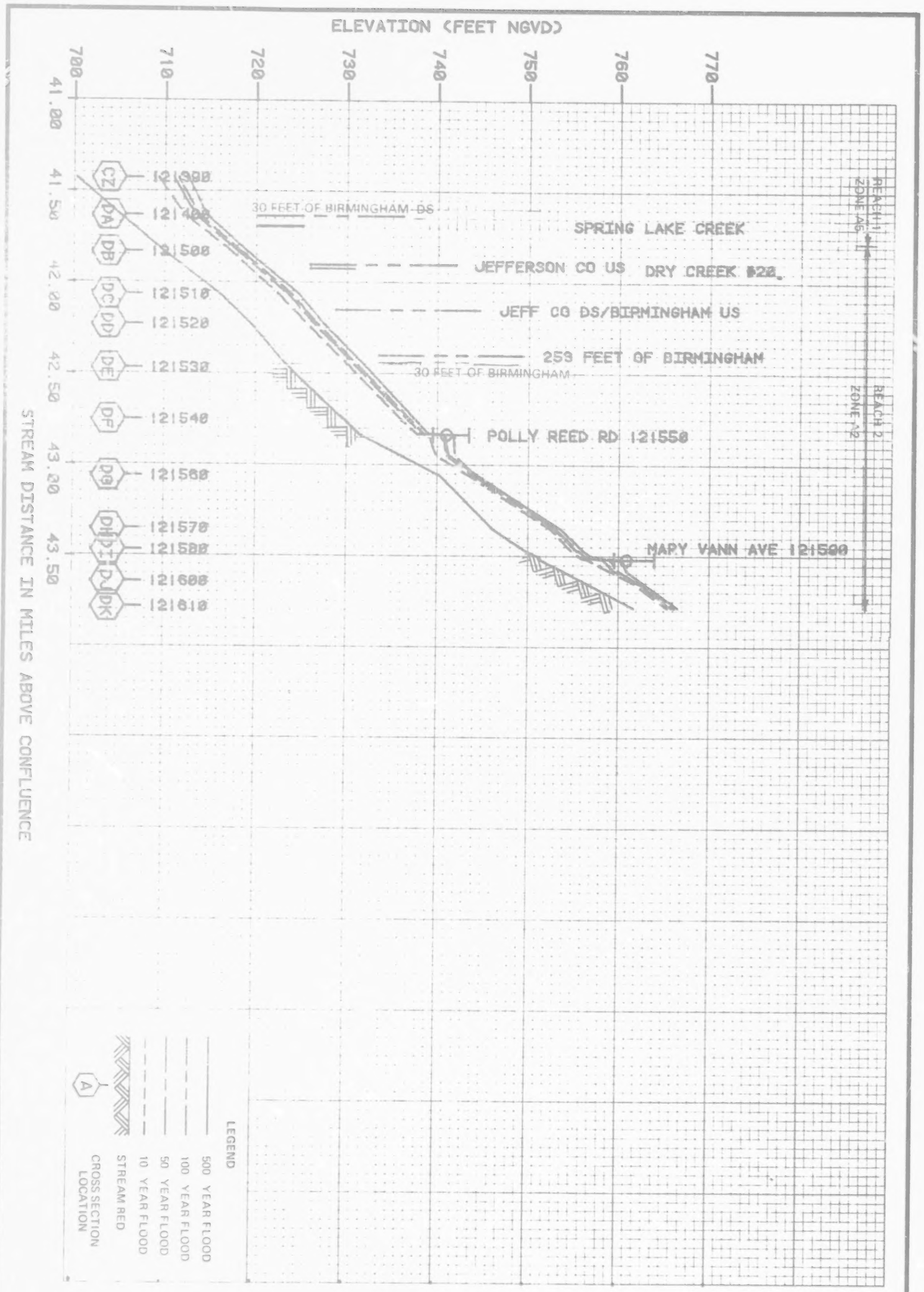
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD PROFILES

FIVEMILE CREEK (FIVEMILE CREEK BASIN)



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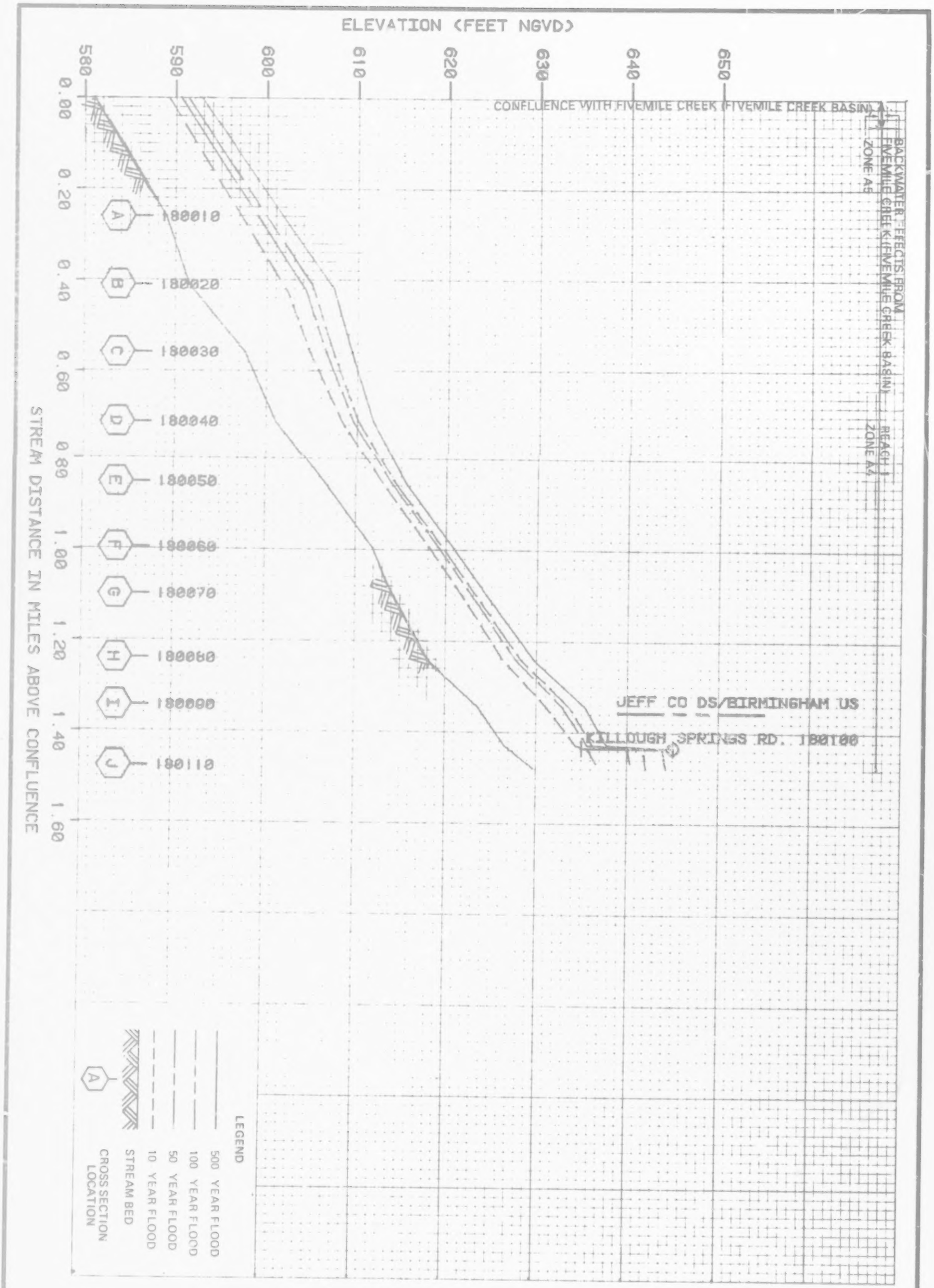


06P

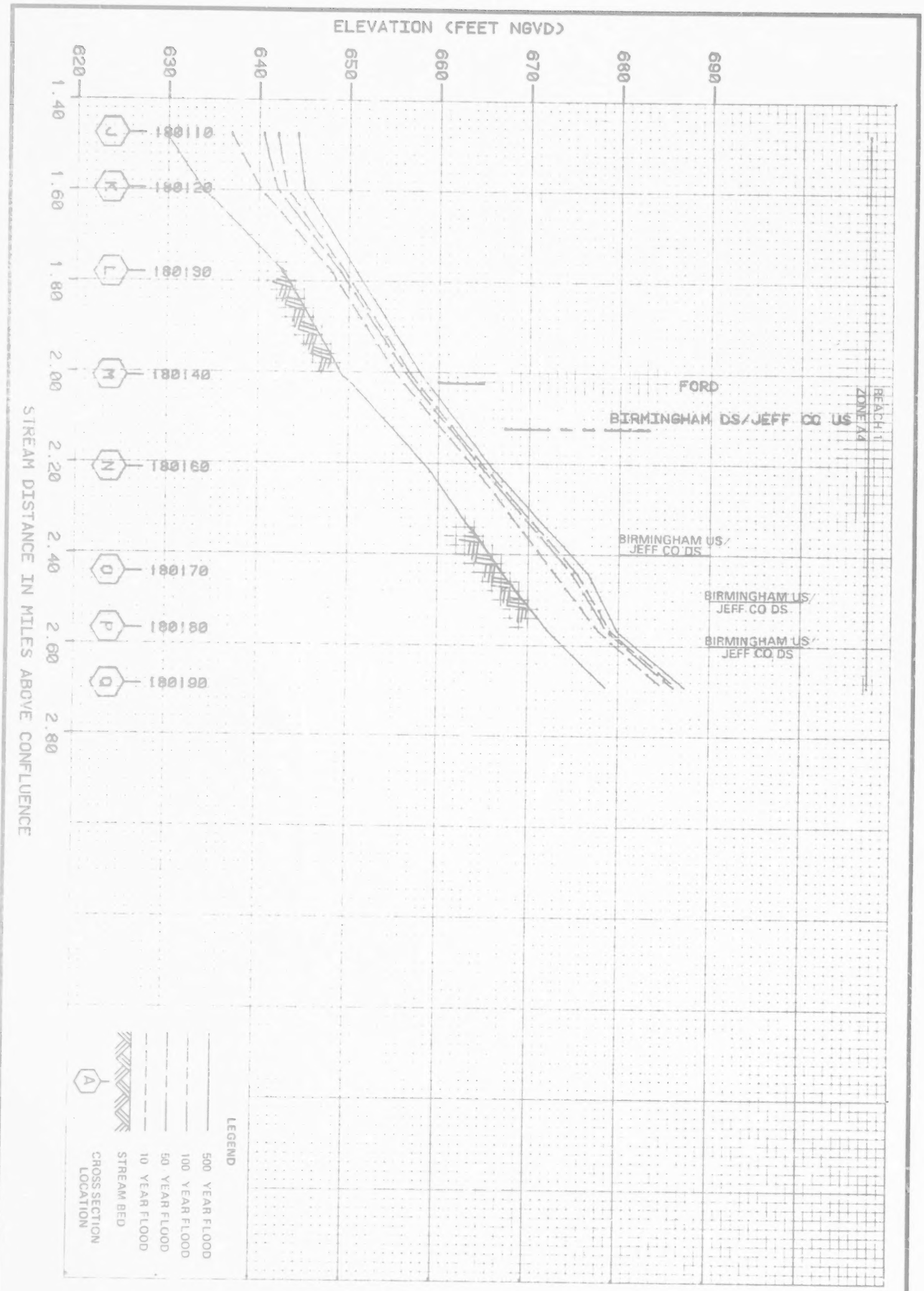
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD PROFILES

TARRANT SPRINGS BRANCH



07P

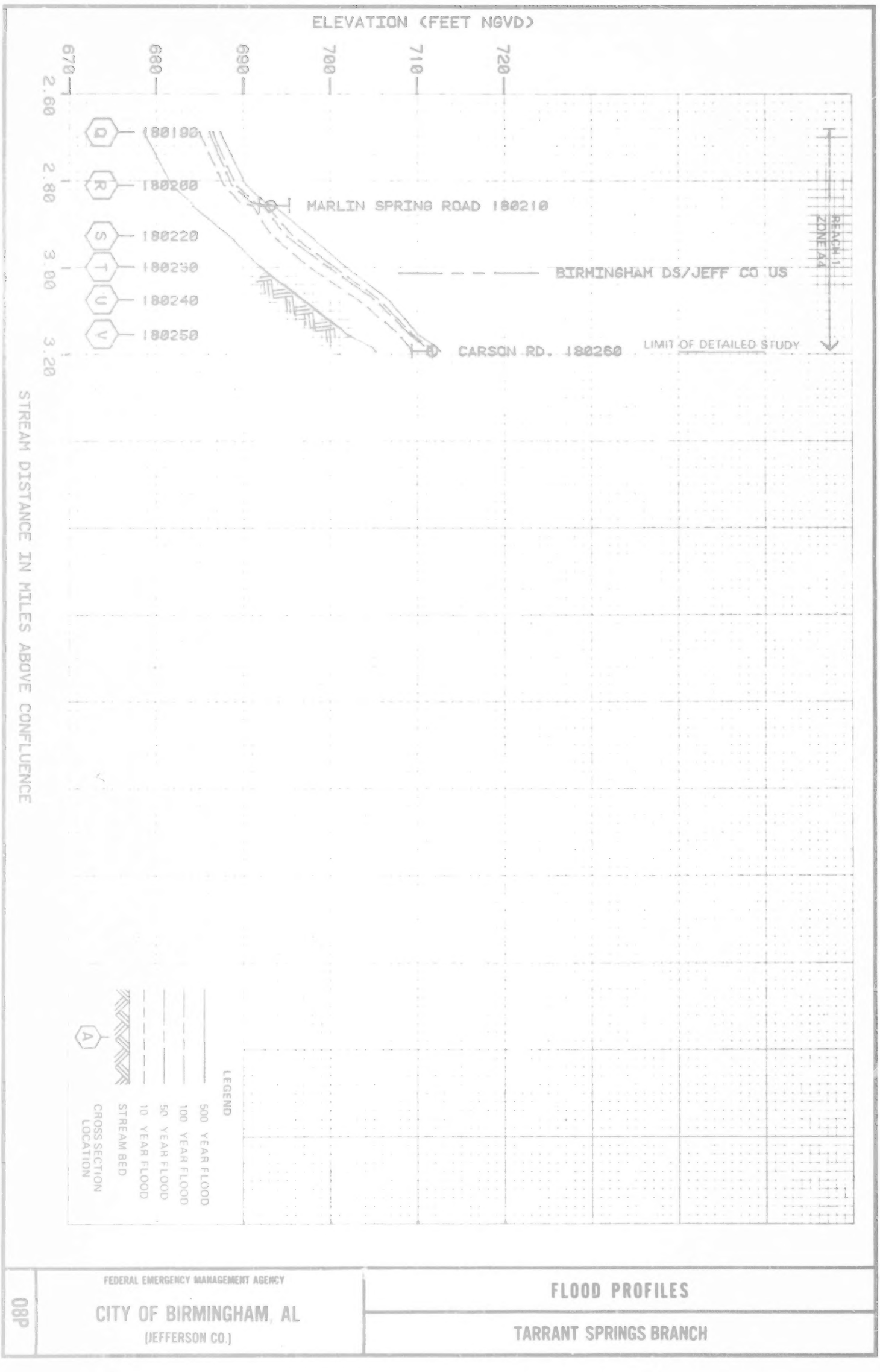
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD PROFILES

TARRANT SPRINGS BRANCH



08P

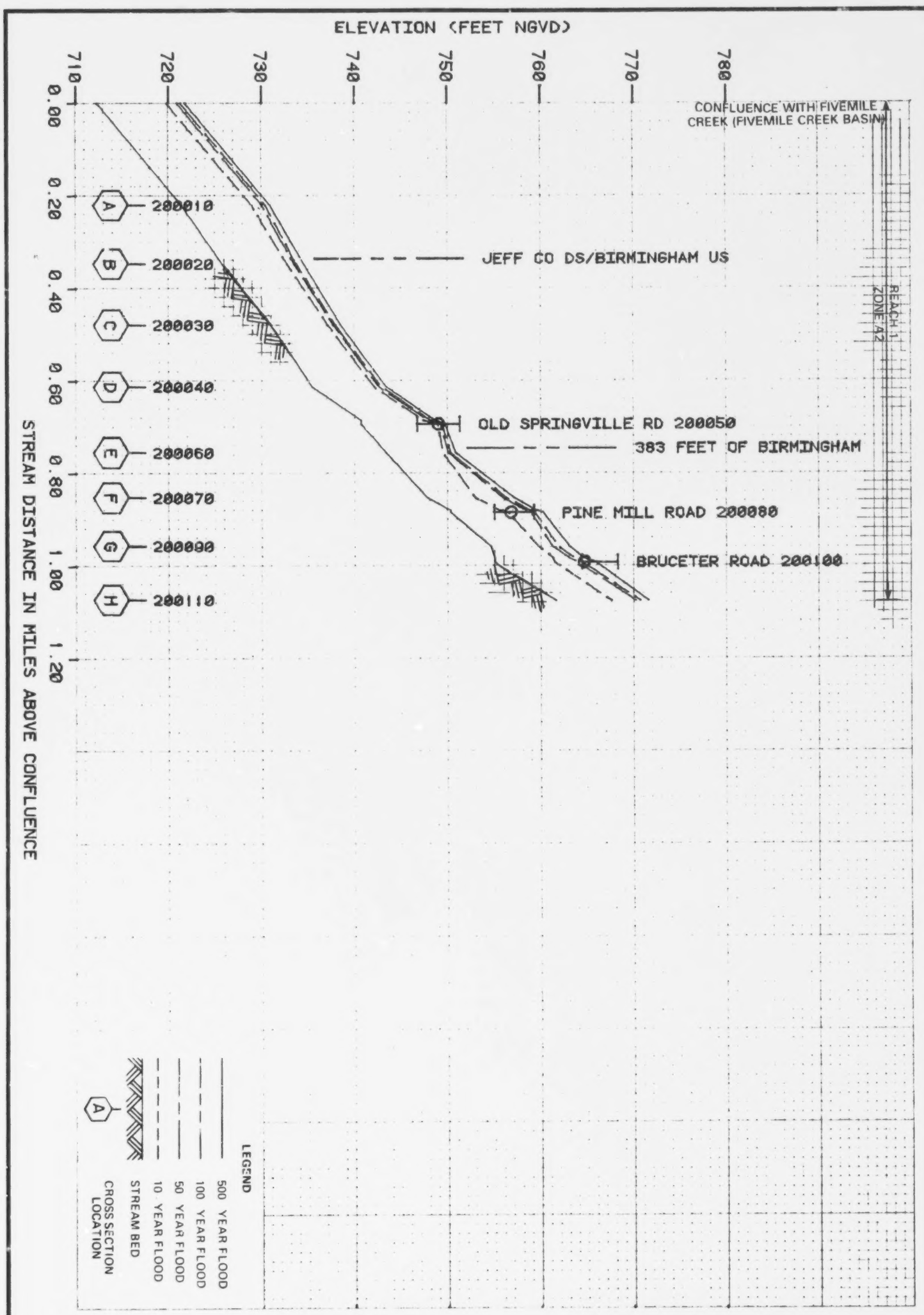
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD PROFILES

TARRANT SPRINGS BRANCH



09P

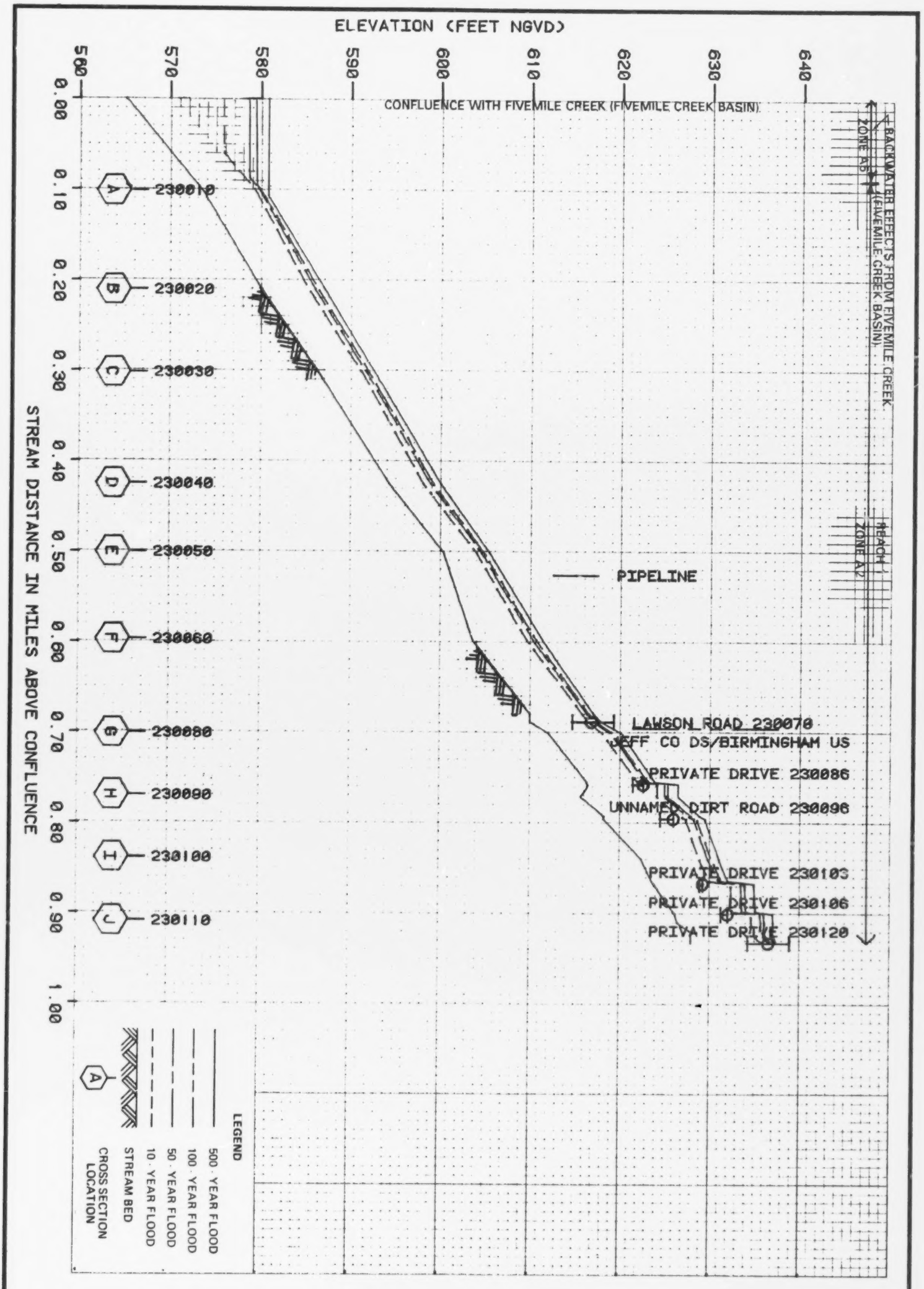
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

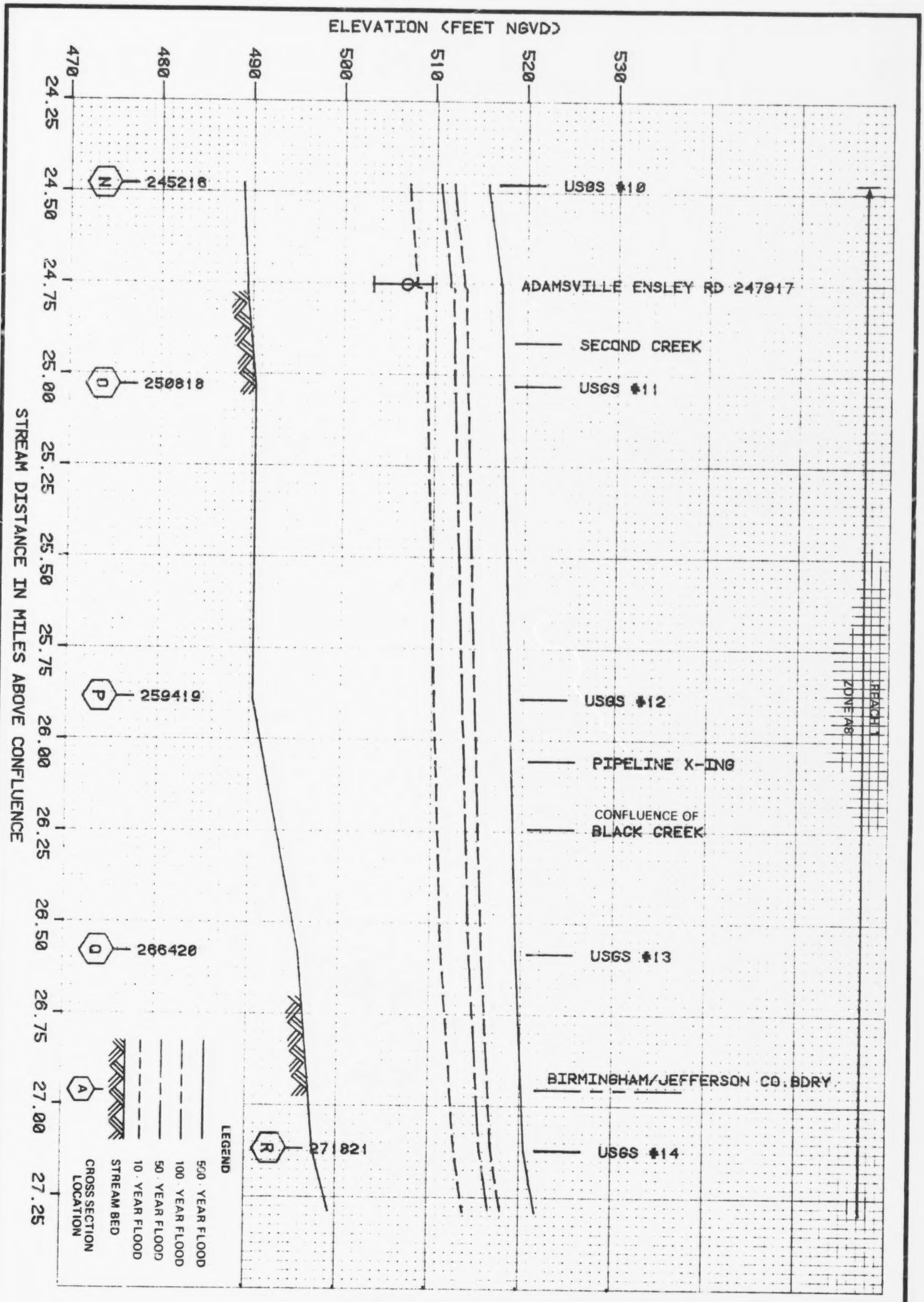
(JEFFERSON CO.)

FLOOD PROFILES

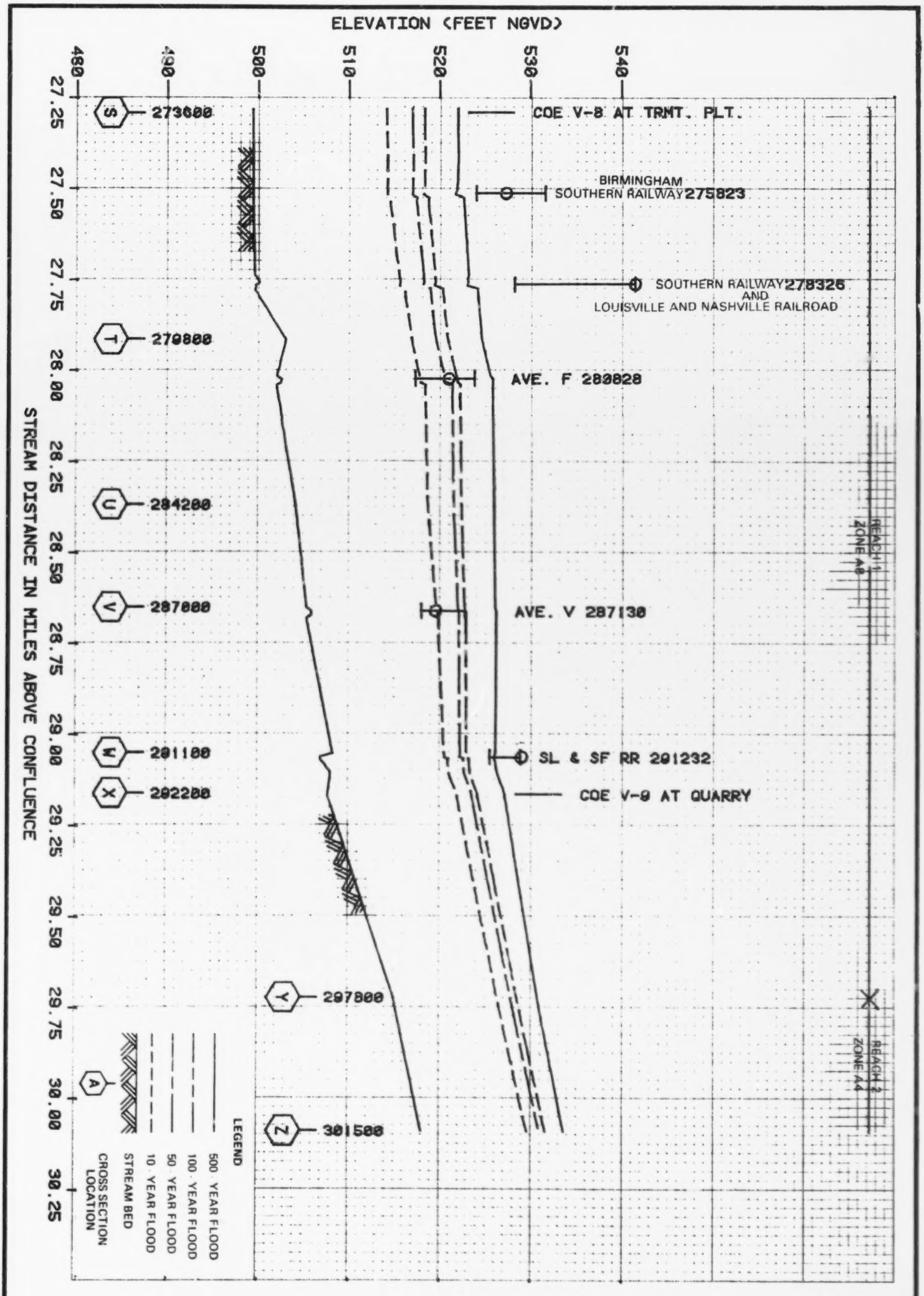
DRY CREEK



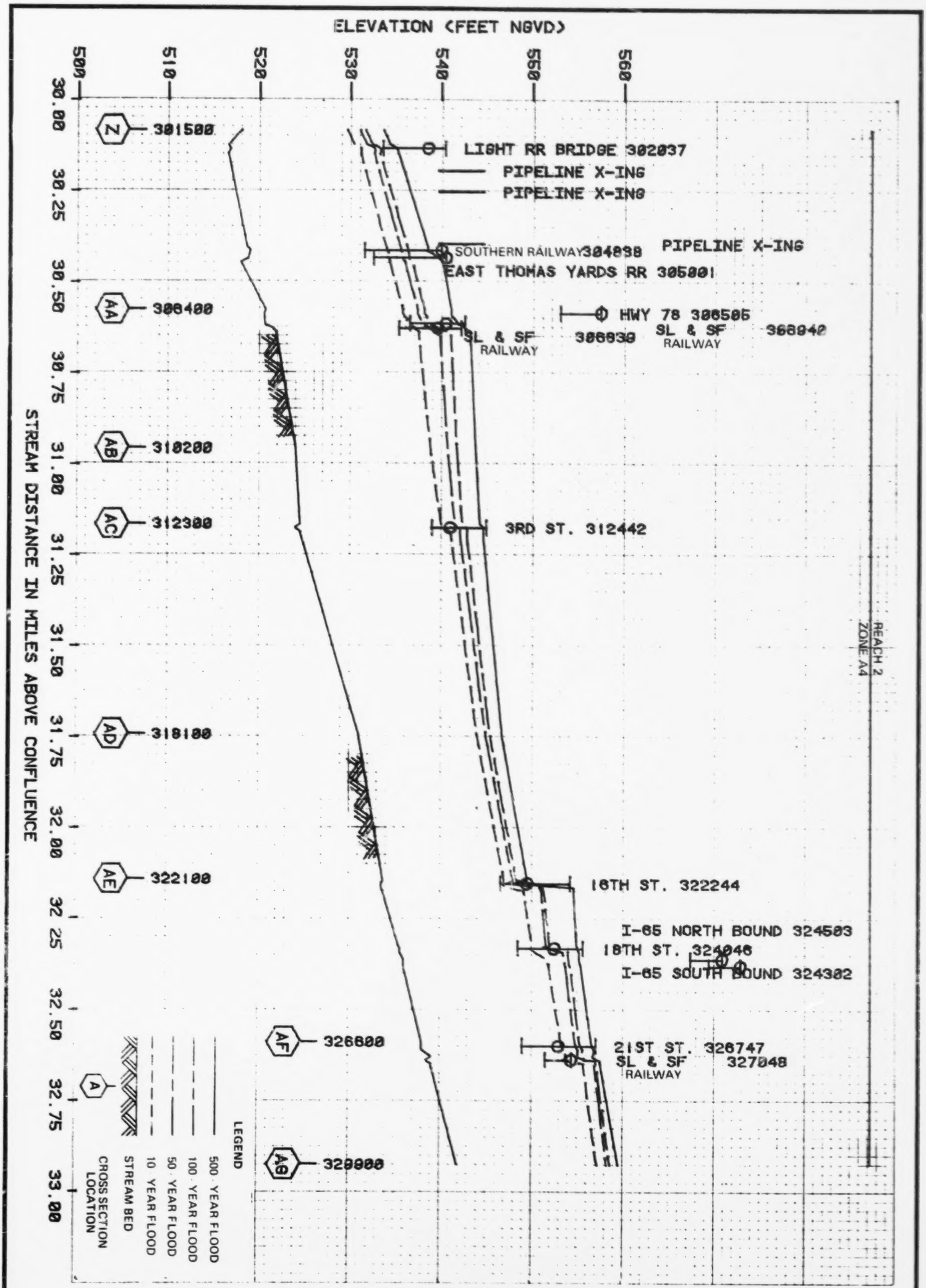
10P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES UNNAMED CREEK 23



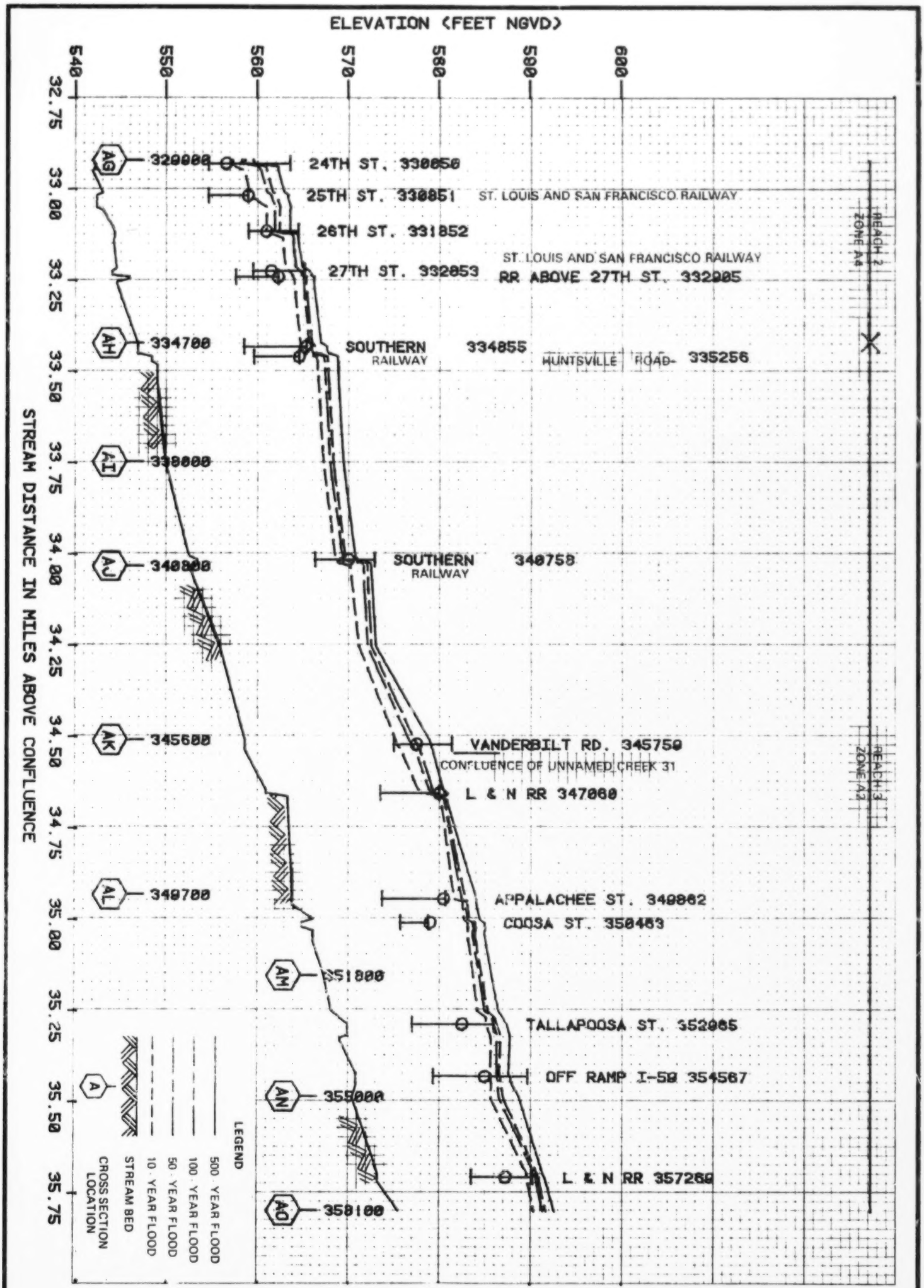
11P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES VILLAGE CREEK



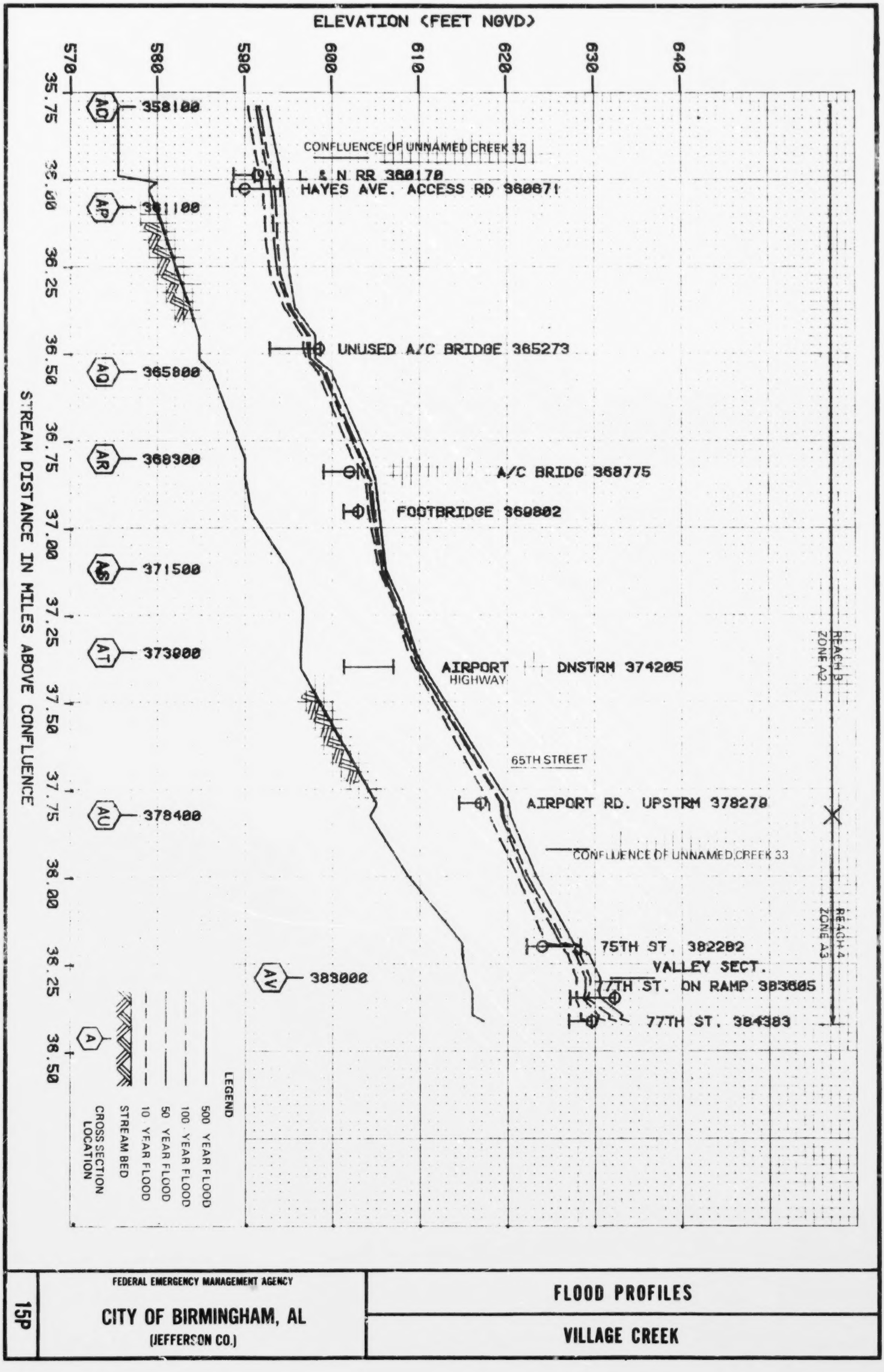
12P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES VILLAGE CREEK



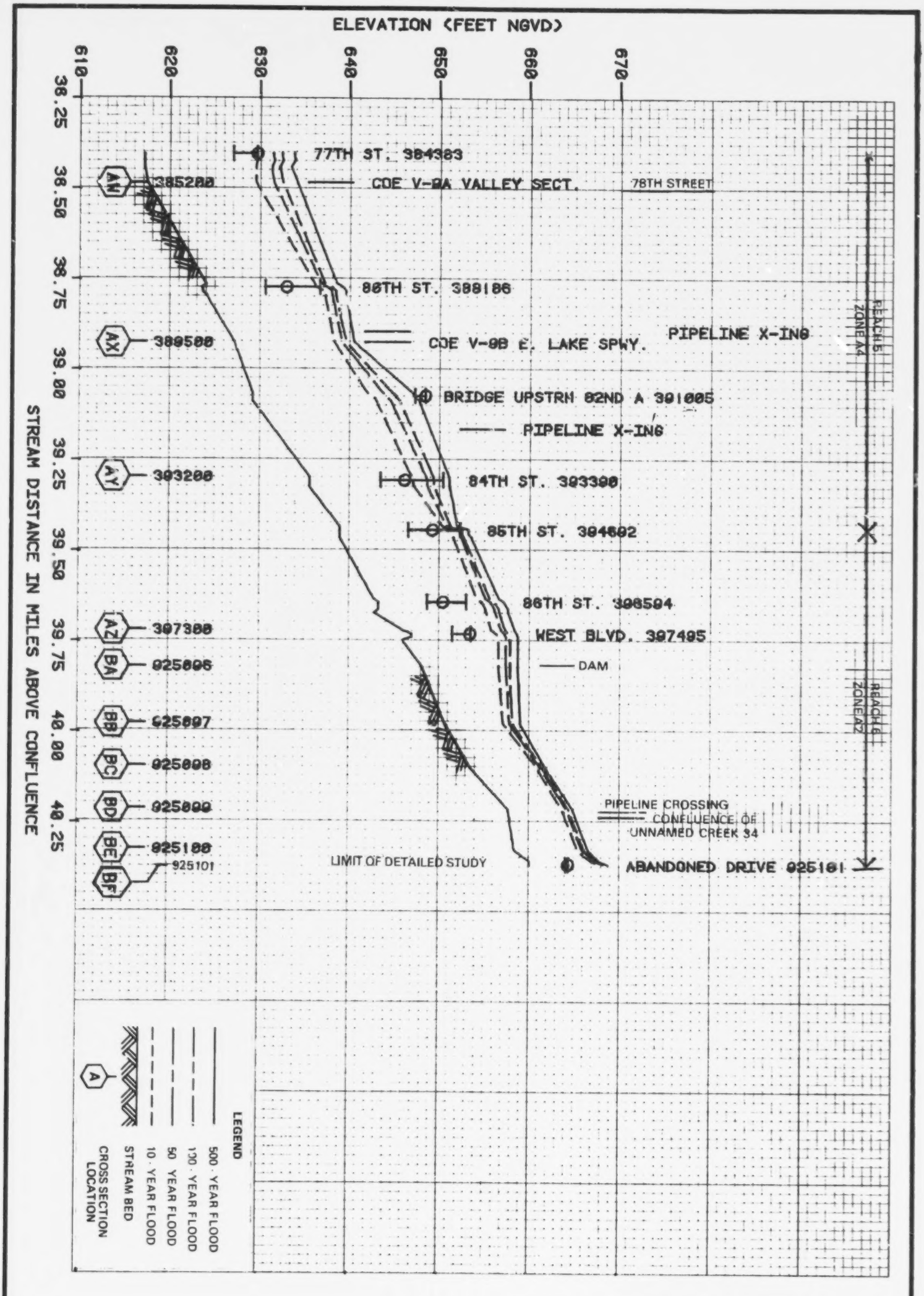
13P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES VILLAGE CREEK



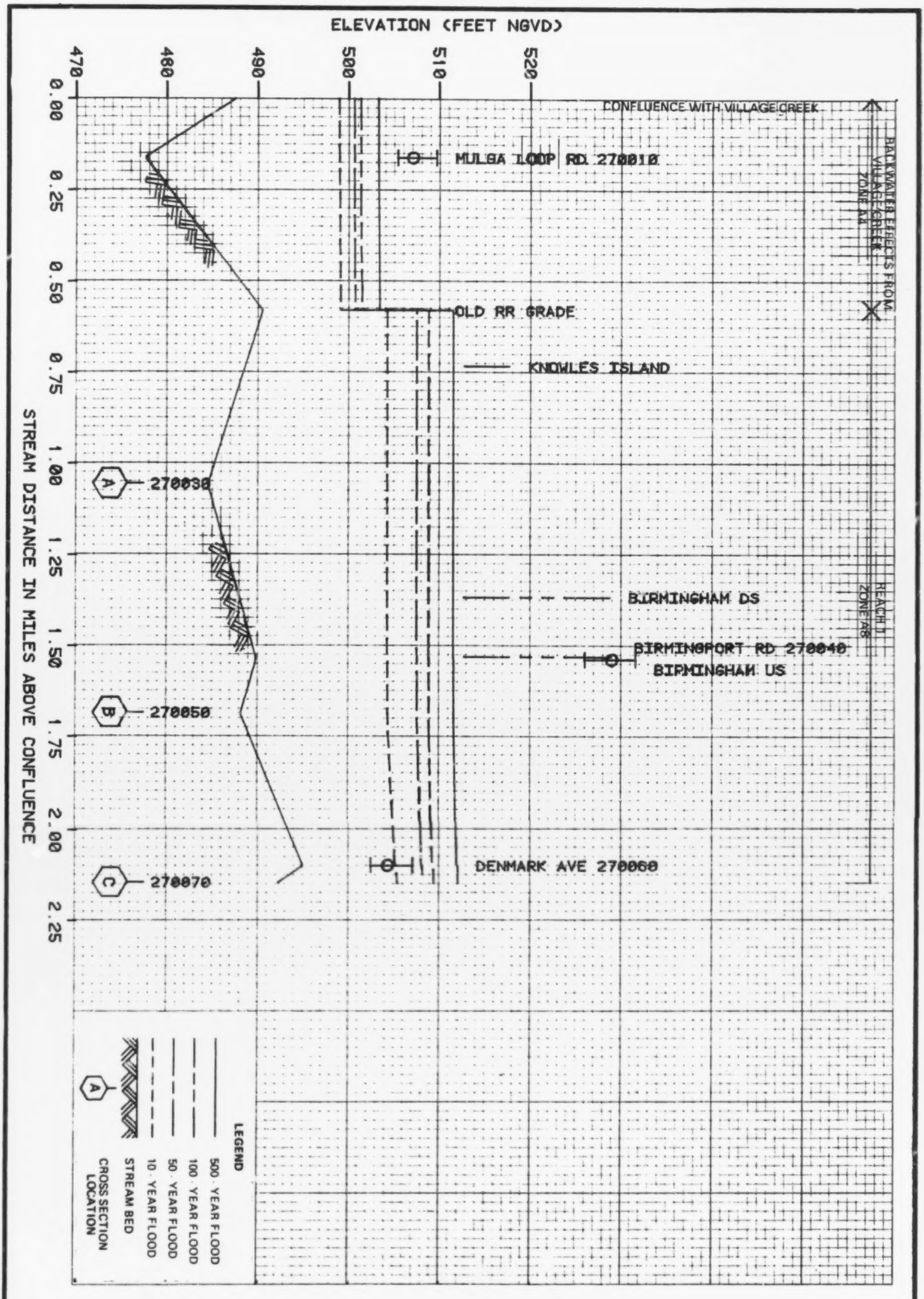
14P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES VILLAGE CREEK



15P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES VILLAGE CREEK



16P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES VILLAGE CREEK



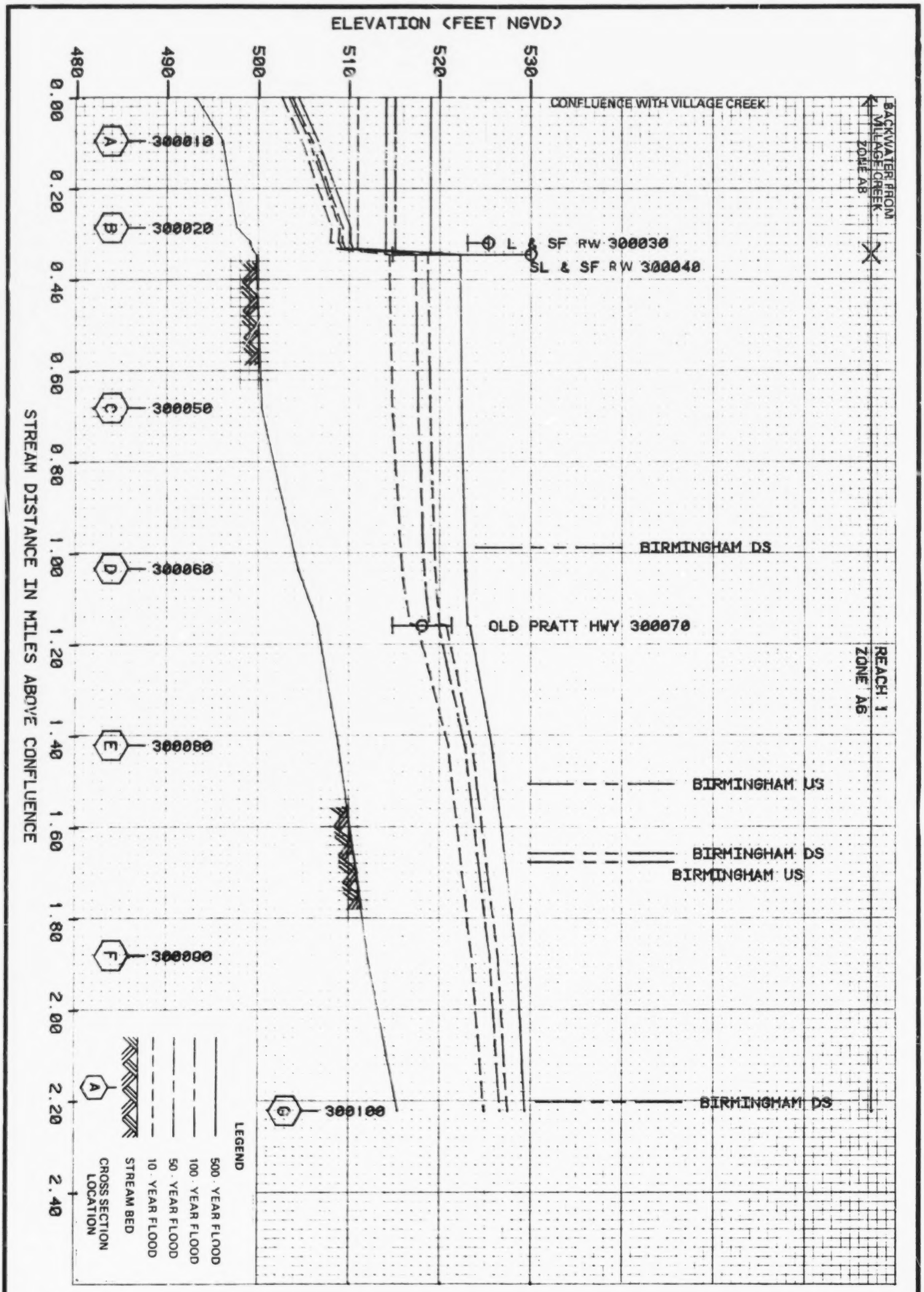
17P

FEDERAL EMERGENCY MANAGEMENT AGENCY

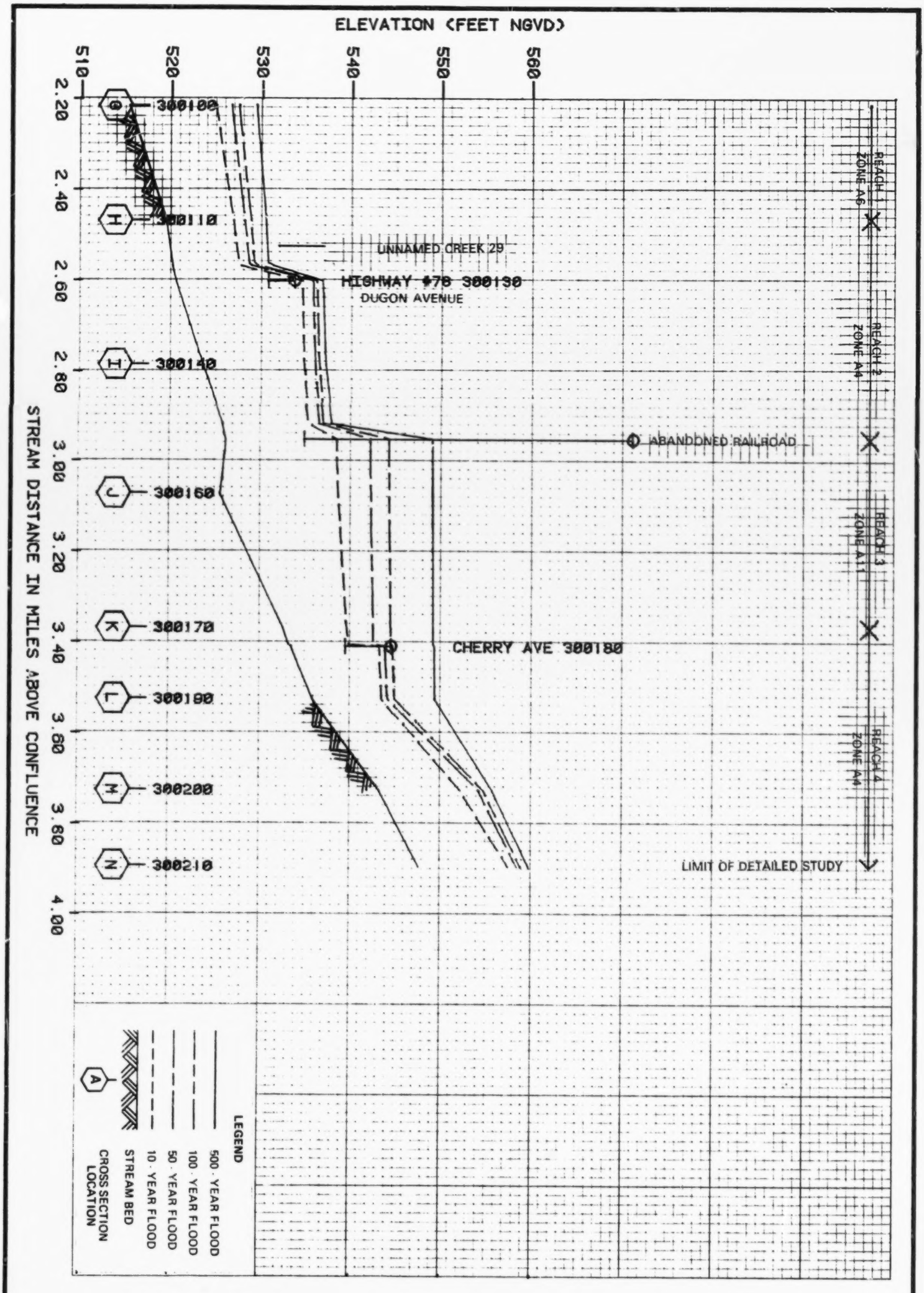
CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOOD PROFILES

CAMP BRANCH



18P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES BLACK CREEK (VILLAGE CREEK BASIN)



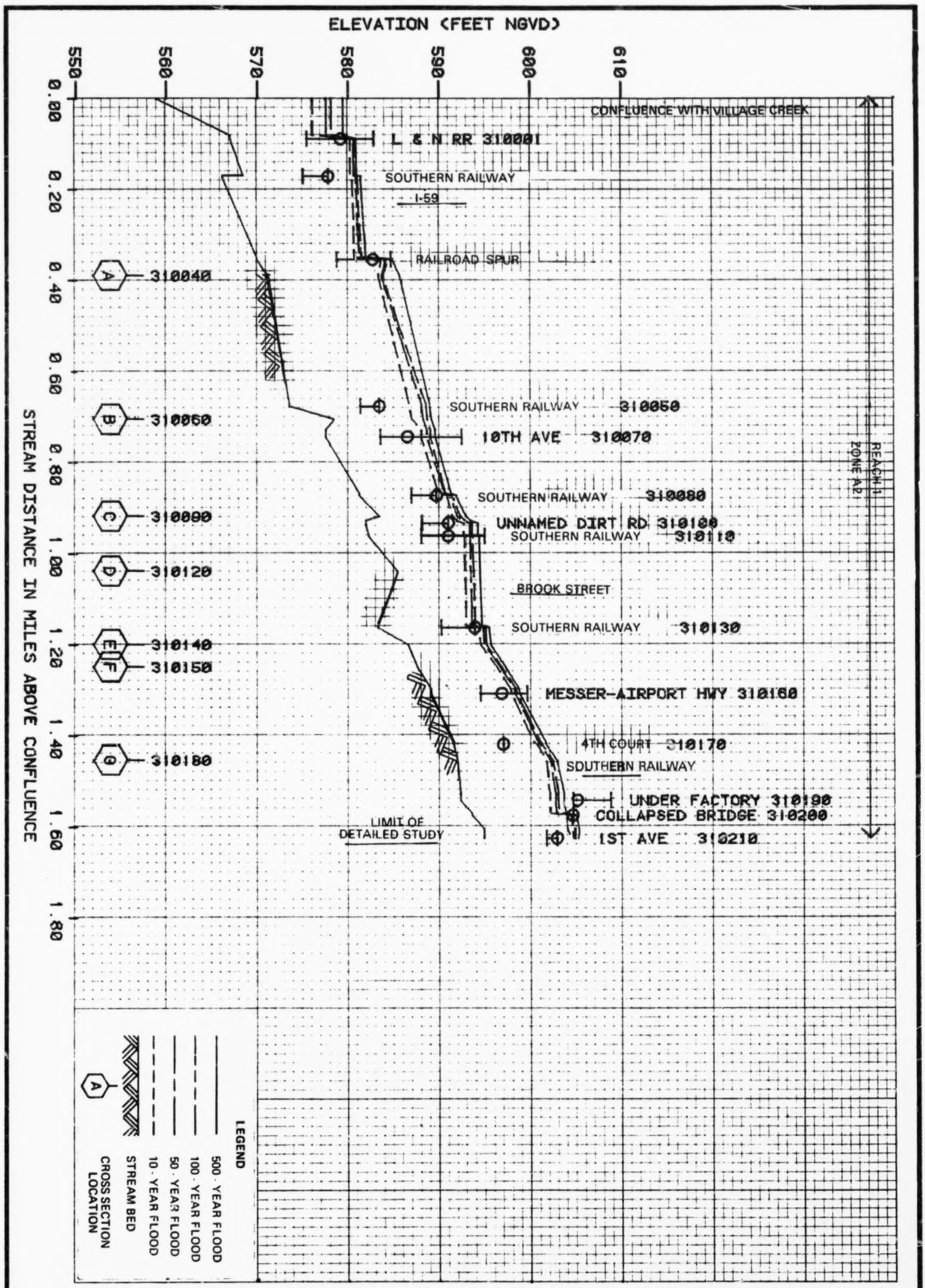
19P

FEDERAL EMERGENCY MANAGEMENT AGENCY

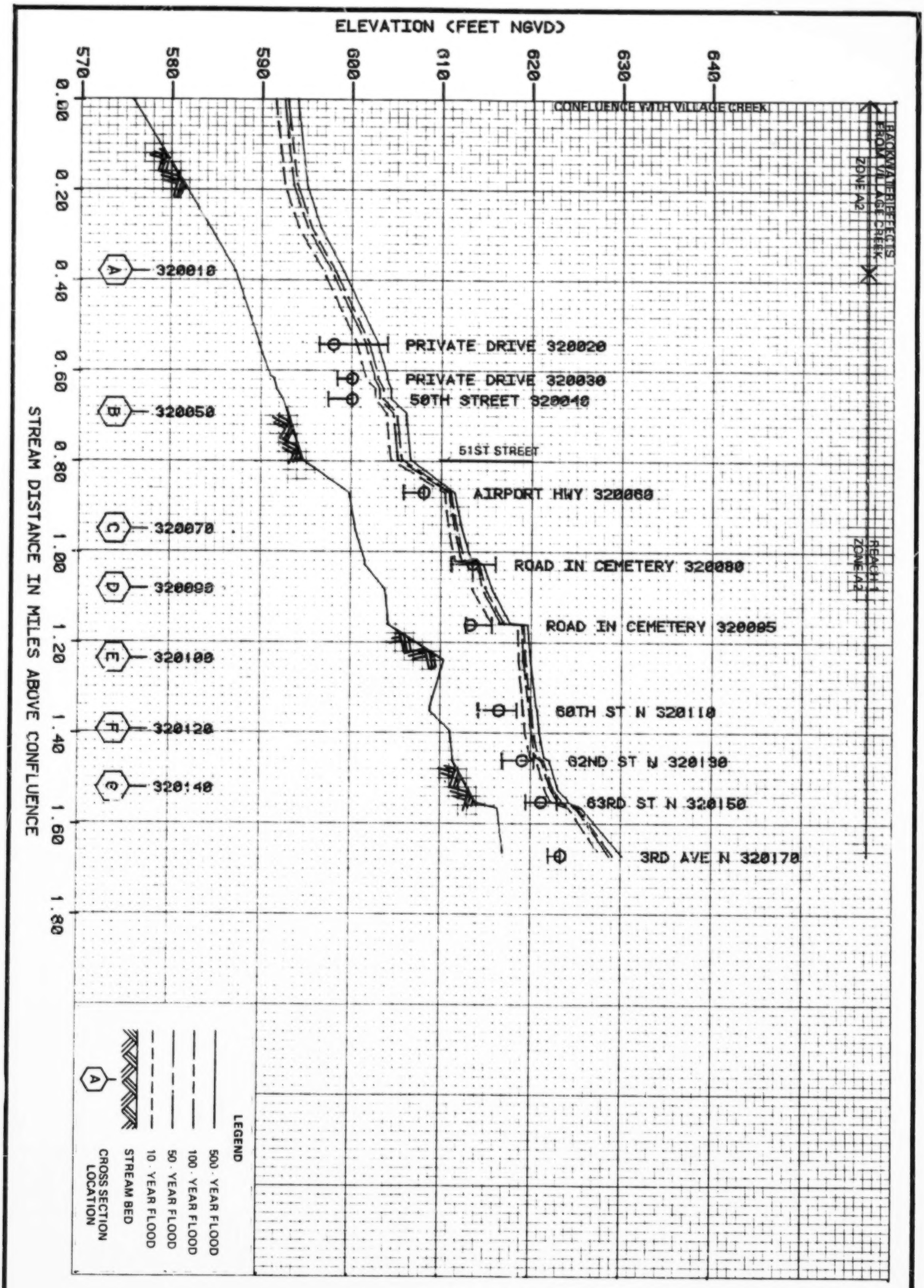
CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOOD PROFILES

BLACK CREEK (VILLAGE CREEK BASIN)



20P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES UNNAMED CREEK 31



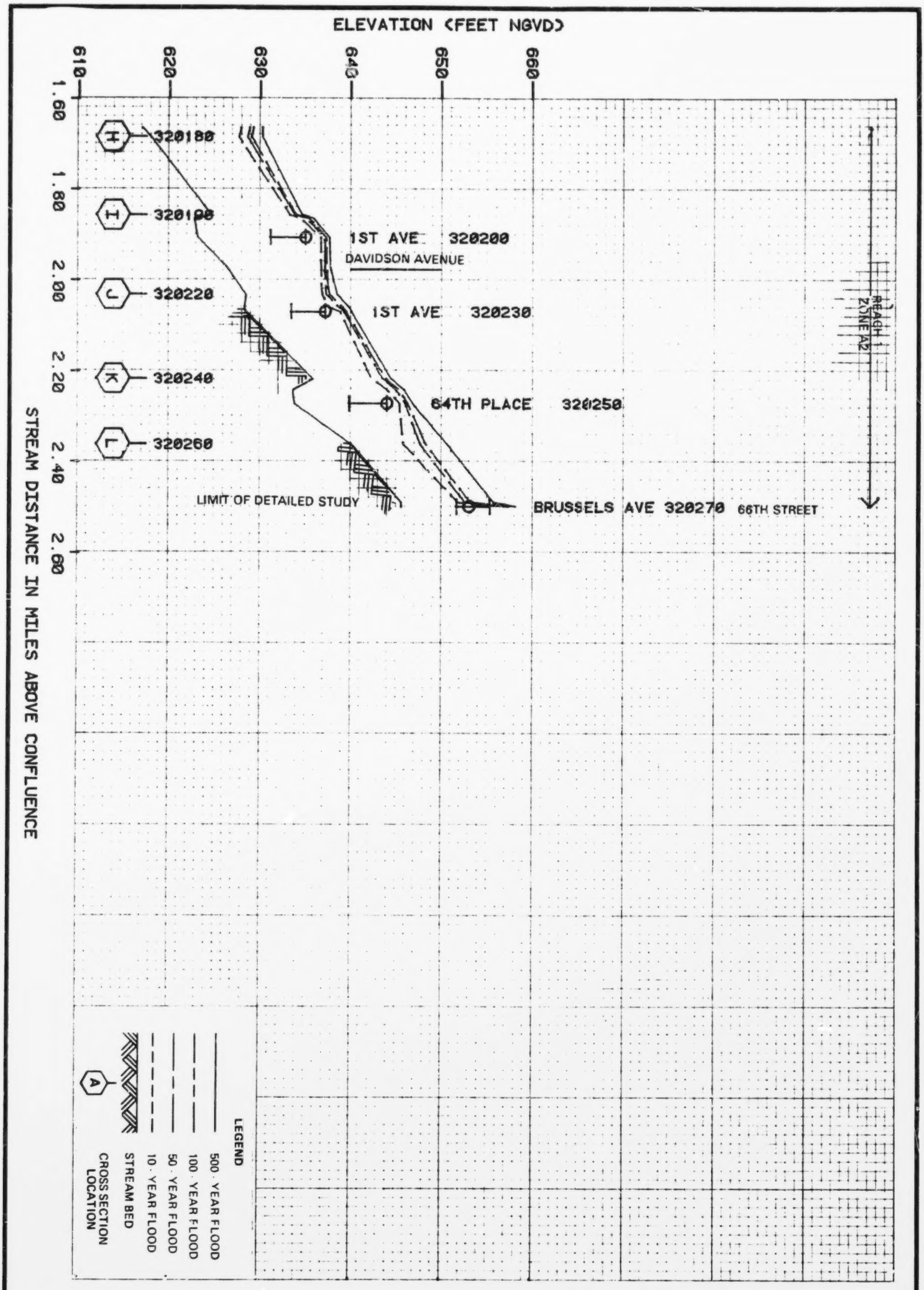
21P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOOD PROFILES

UNNAMED CREEK 32



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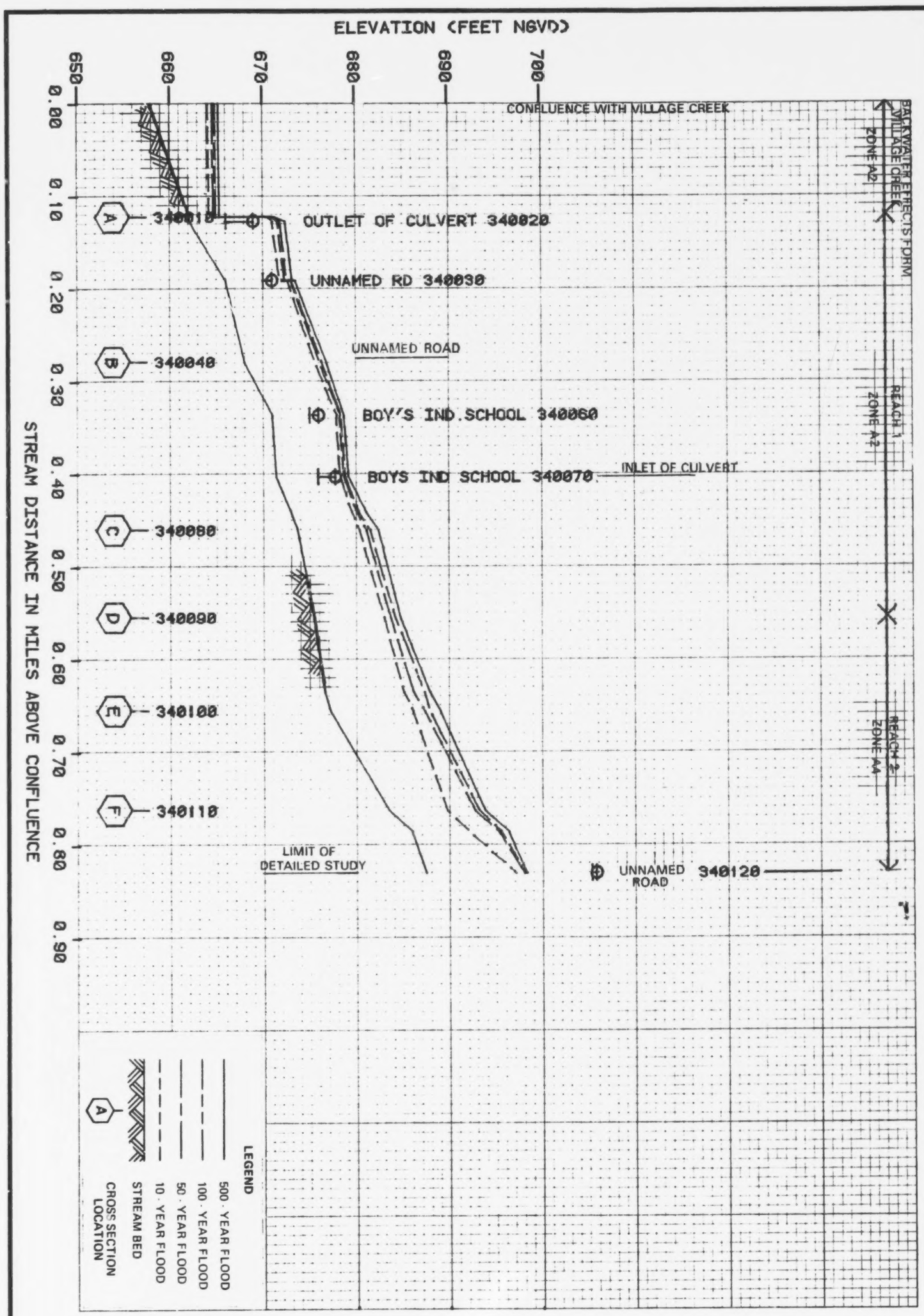


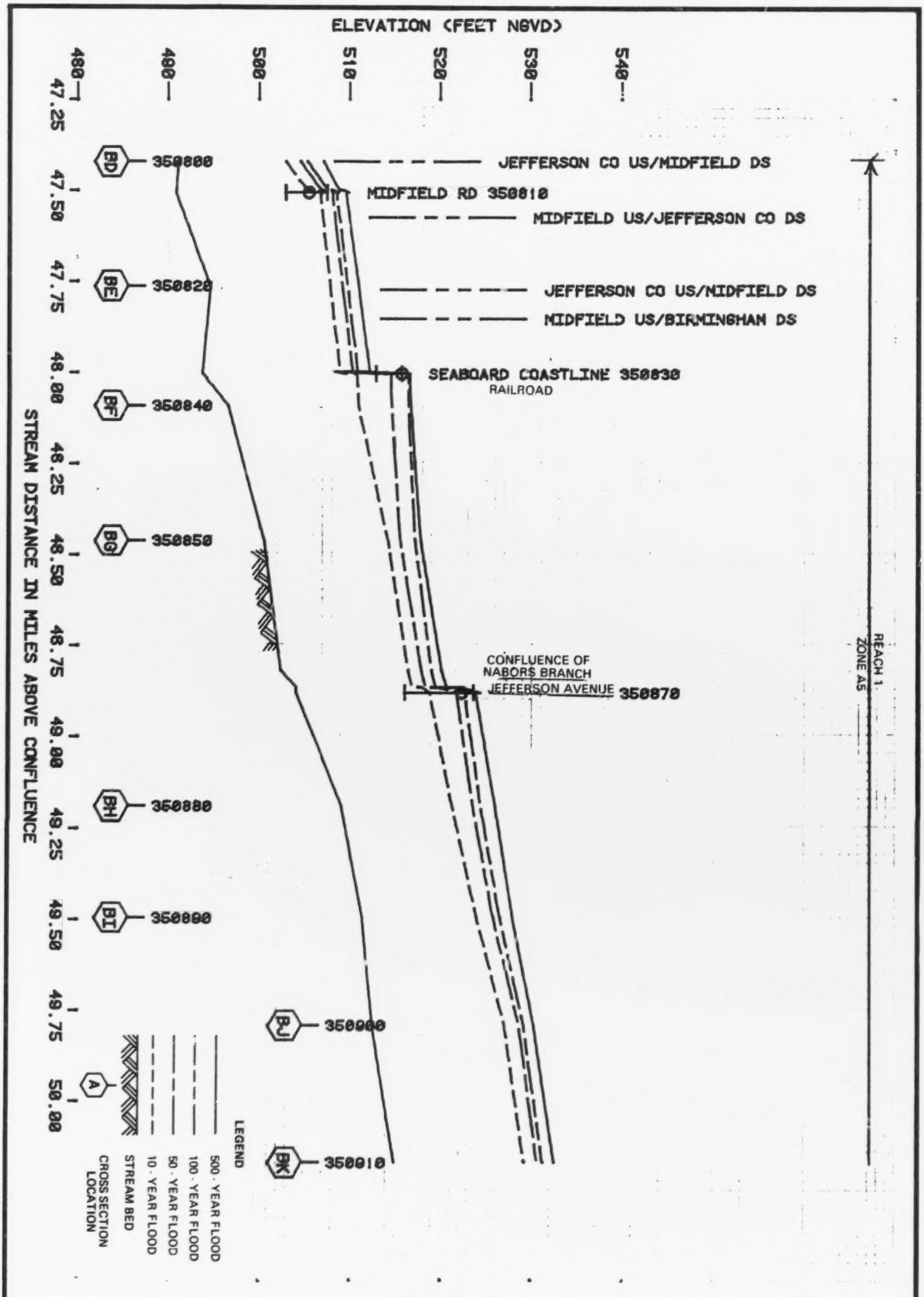
23P

FEDERAL EMERGENCY MANAGEMENT AGENCY

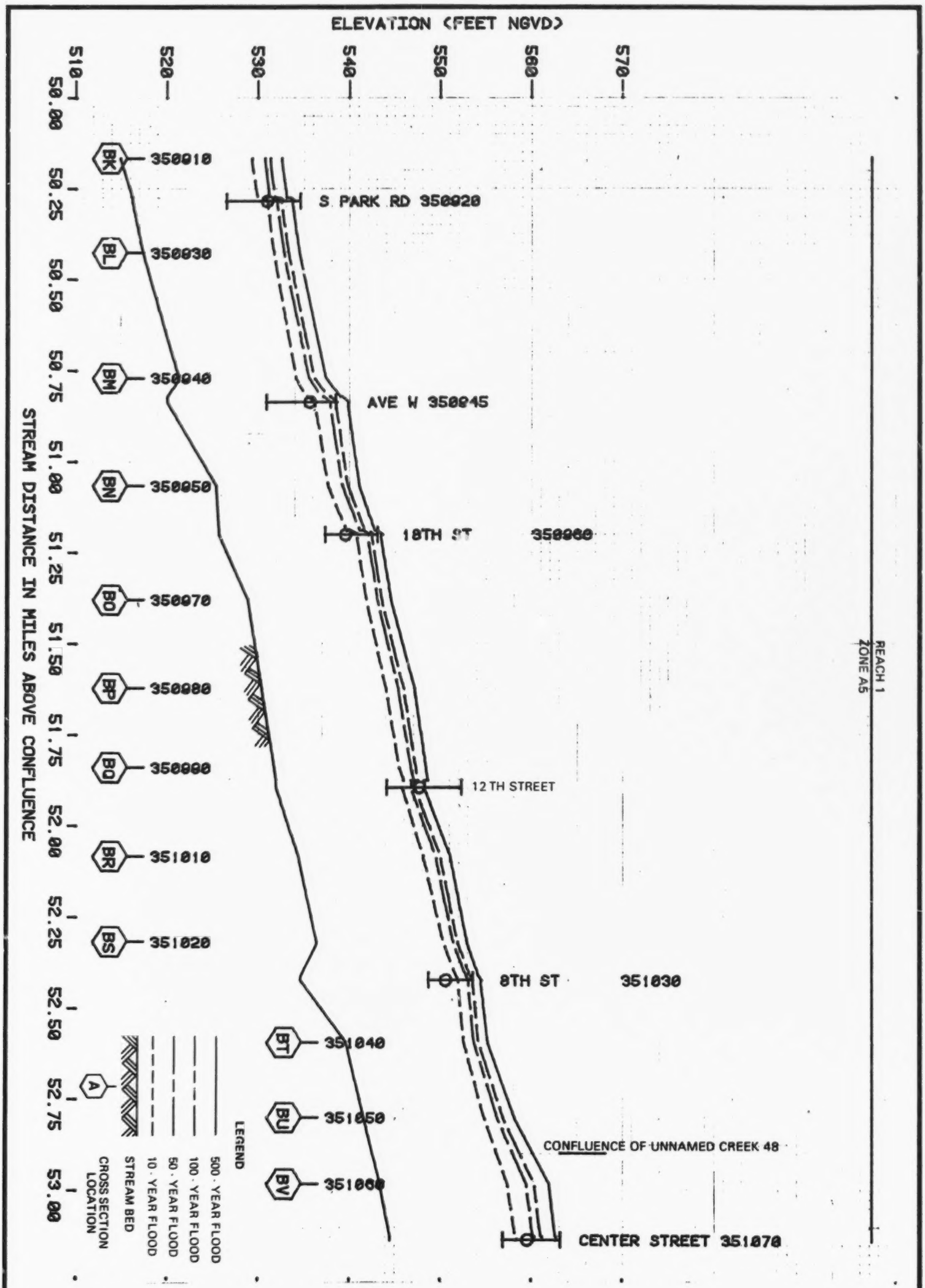
CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOOD PROFILES

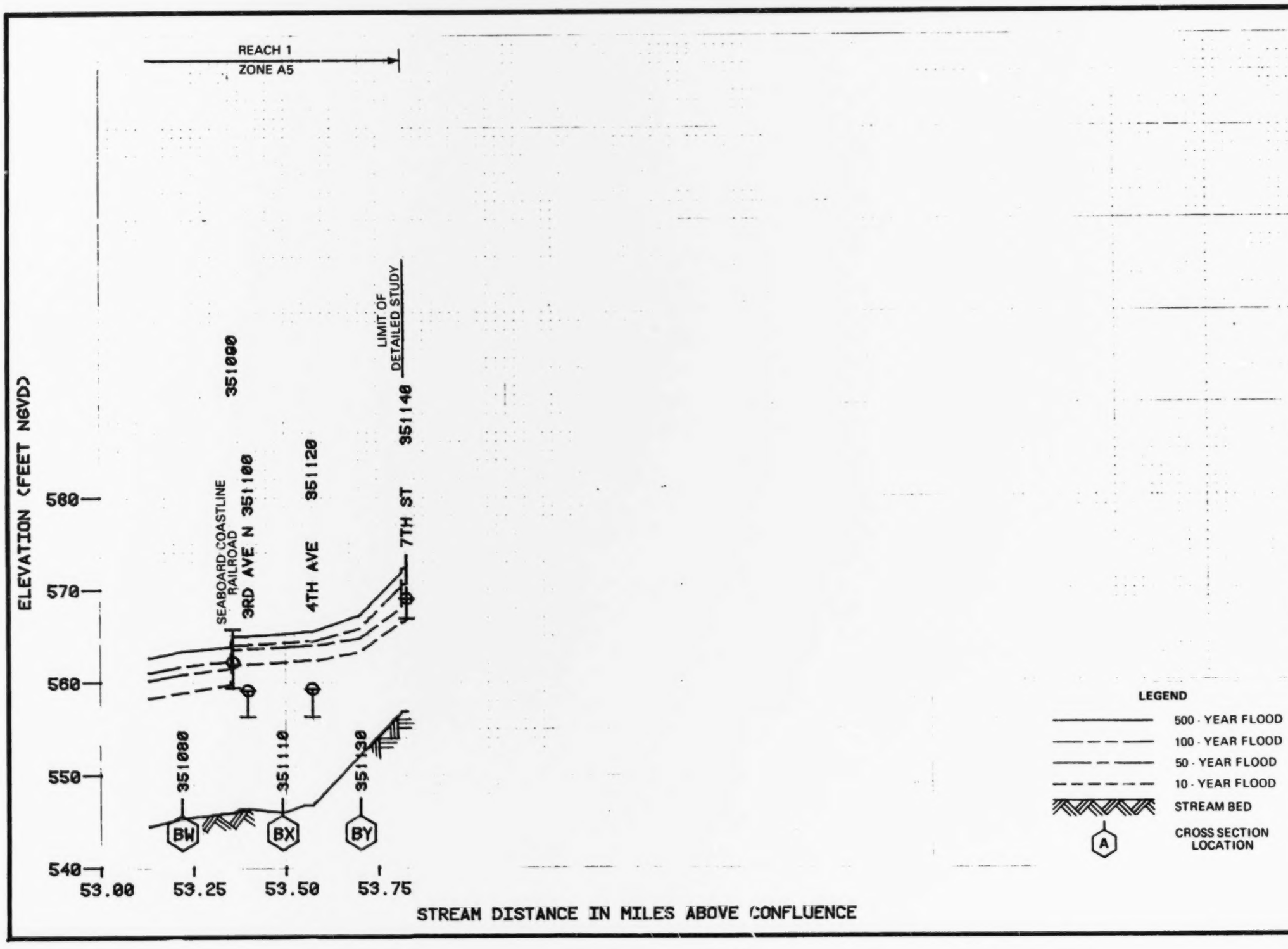
UNNAMED CREEK 34



24P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES VALLEY CREEK



25P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF BIRMINGHAM, AL (JEFFERSON CO.)	FLOOD PROFILES VALLEY CREEK



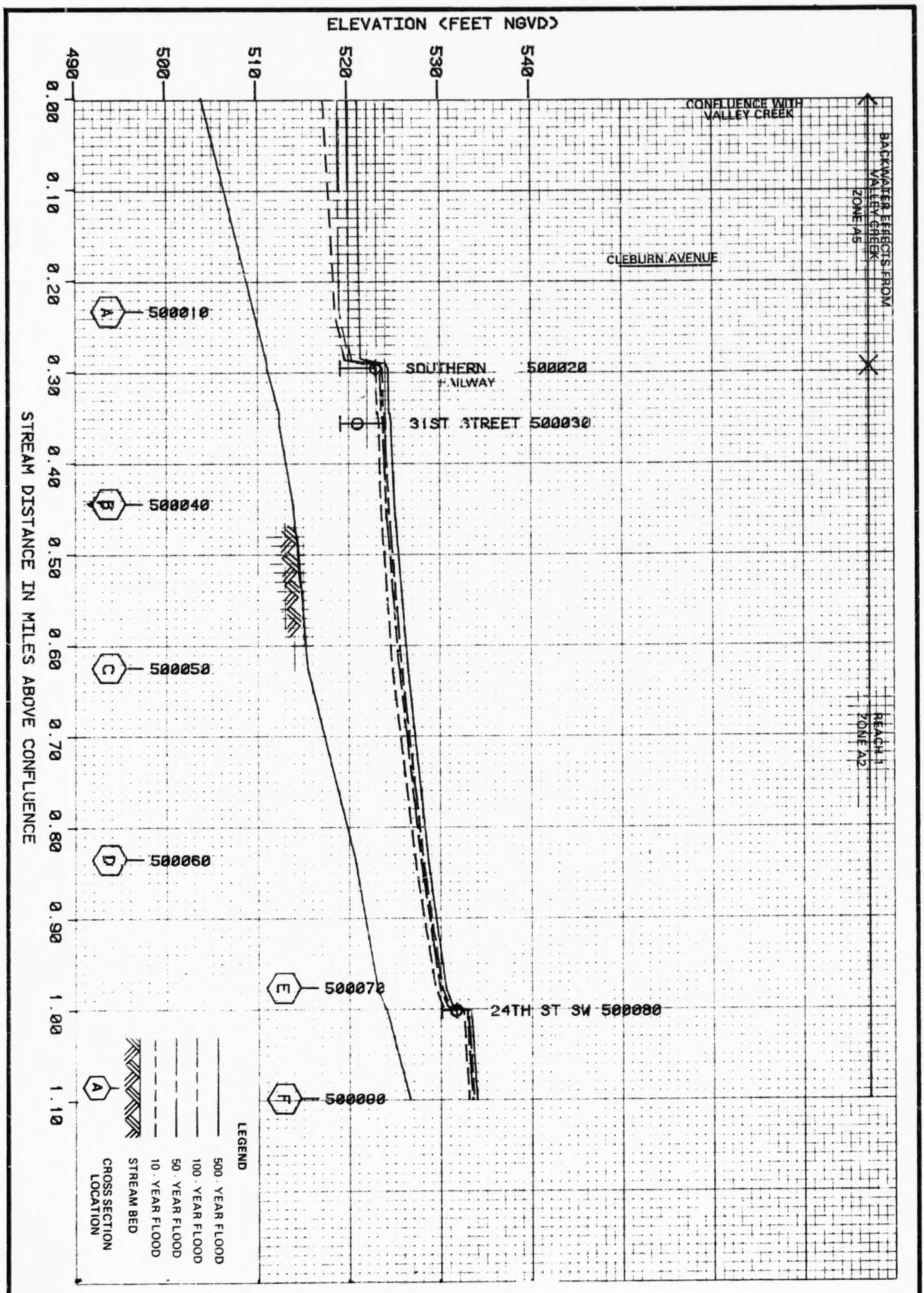
FLOOD PROFILES

VALLEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

26P



27P

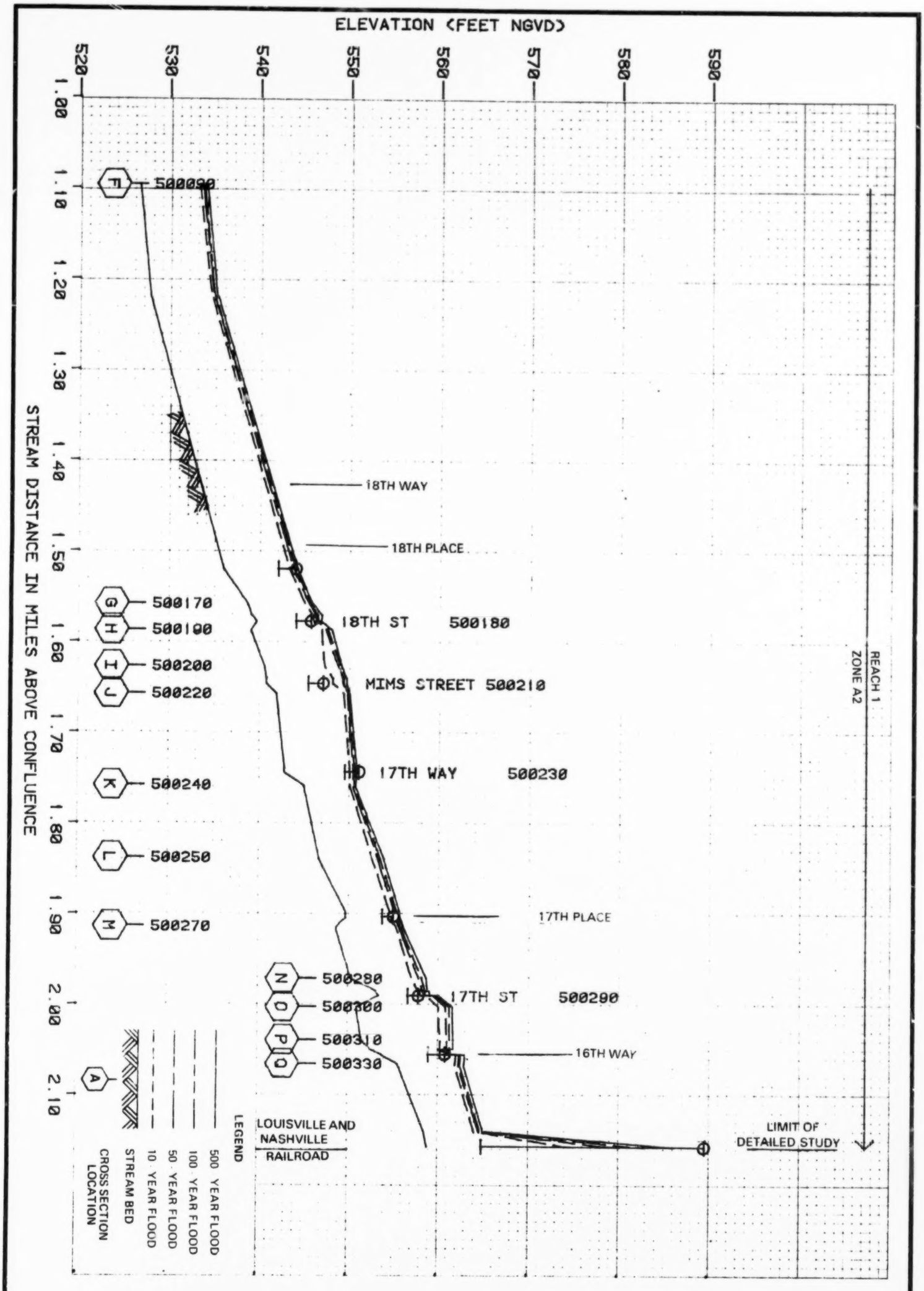
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD PROFILES

NABORS BRANCH



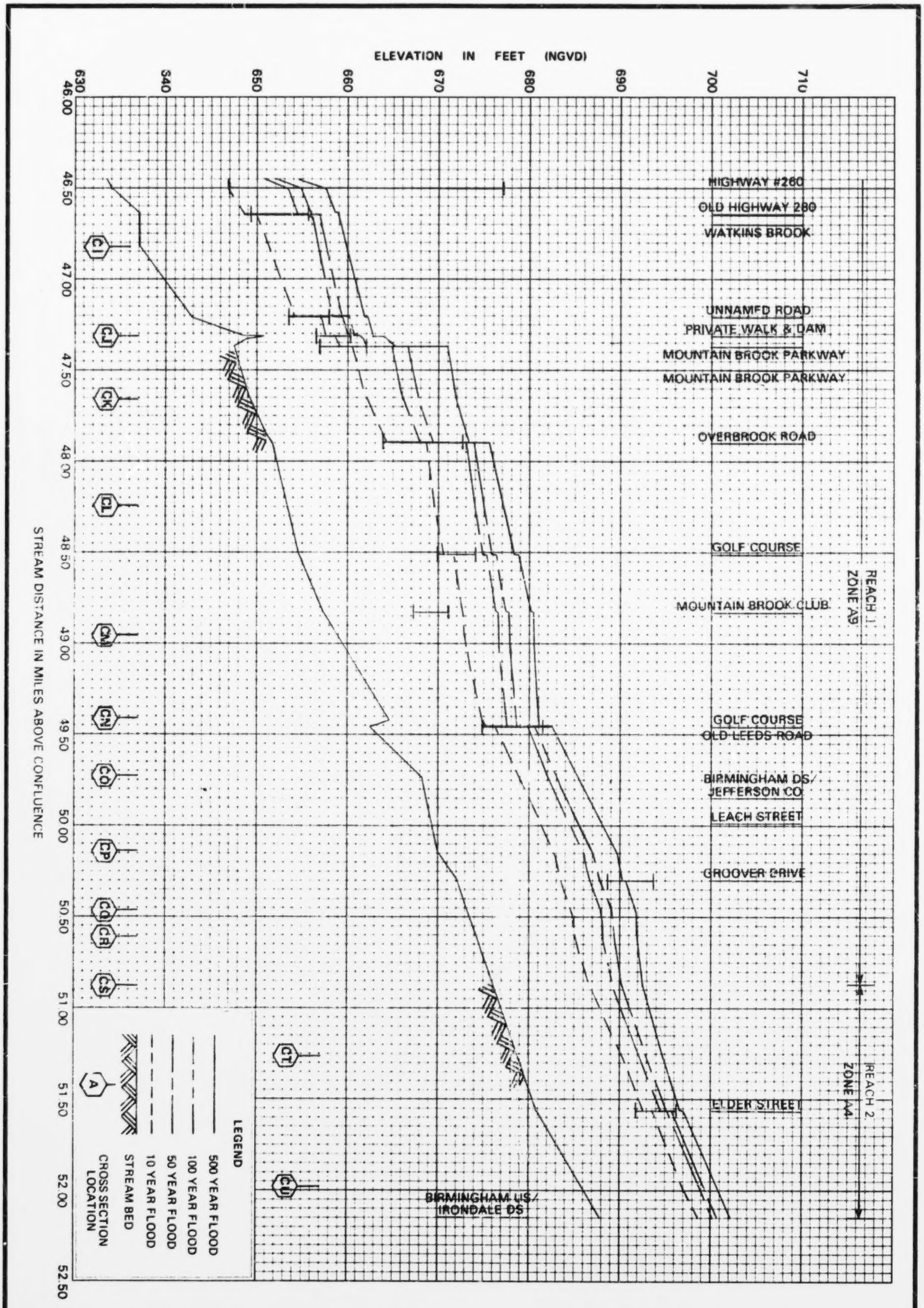
28P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL
(JEFFERSON CO.)

FLOOD PROFILES

NABORS BRANCH



29P

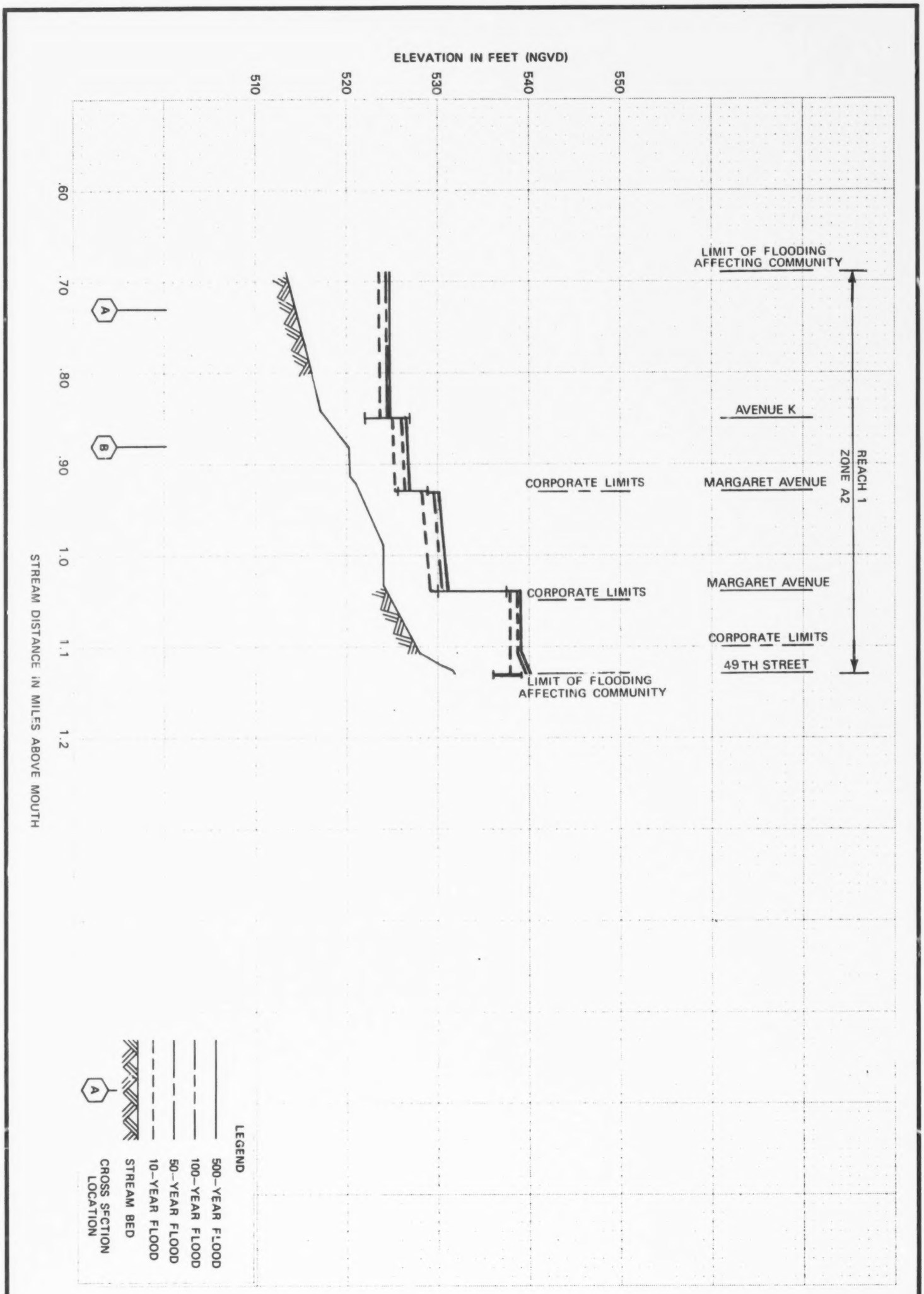
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BIRMINGHAM, AL

(JEFFERSON CO.)

FLOOD PROFILES

SHADES CREEK



30P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF BIRMINGHAM, AL** (JEFFERSON CO.)	**FLOOD PROFILES** **UNNAMED CREEK 45**